OUTNAL AMERICAN VETERINARY MEDICAL ASSOCIATION

AVMA Convention-San Antonio, Oct. 15-18, 1956

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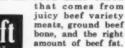
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News From Washington



The Army has been granted an extension of time, date not specified, for submitting **a plan** to Defense Secretary Wilson regarding the **Veterinary Corps** of the Army and Air Force (see JOURNAL, July 15, adv. p. 8). Secretary Wilson has modified another part of his May 15 memorandum by authorizing the Army and Air Force to call to active duty the number of veterinary officers required by operational necessity. Those ordered to duty will be from the 1956 graduates commissioned from veterinary R.O.T.C.

We have been informed the Reserve Officers' Association adopted a resolution at their recent national convention in New Orleans recording opposition to the elimination of the Veterinary Corps and directing that every effort be

made to maintain its continuance and mission.

* * * *

Self-employed **veterinarians**, together with other professional groups, **are included in the Social Security bill** (H.R. 7225) which was passed in the closing hours of the 84th Congress. Physicians are not included. The bill will become law when and if signed by the President.

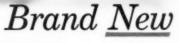
* * *

The Senate, instead of passing legislation that would make the **humane methods** in the **slaughter** of **livestock** and **poultry** compulsory, accepted the amendment reported by the Senate Committee on Agriculture. The amended bill (S.1636), passed July 23, declared among other things it to be the policy of Congress to provide for study and research into improved methods of slaughter; directed the Secretary of Agriculture to provide for study and research into improved methods of slaughter and also directed him to appoint a ten-member Advisory and Research Committee on Humane Slaughter of Livestock and Poultry; and the committee, within two years after enactment of this act, will submit to the Secretary of Agriculture for transmittal to Congress a full report including recommendations for legislative and administrative action. The bill now goes to the House for action. Unless passed prior to adjournment, it will "die."

* * * *

Regardless of Senate Committee on Agriculture reporting out a bill (S.4243) on July 18, which provides for **compulsory inspection** of **poultry** by the U.S.D.A., and of House Subcommittee on Agriculture holding hearings July 17-18 on numerous House bills on the same subject, final action in either house is unlikely prior to adjournment of the Congress. The proposed legislation is controversial, even in the poultry industry, not only regarding who should do the inspection but on other related matters. S.4243 did not specify inspection should be in the Meat Inspection Branch as did S.3983 (**see** JOURNAL, July 15, adv. p. 8). Although three of numerous House bills introduced would amend the Meat Inspection Act, only one (H.R. 12016) specifically provided inspection to be in the Meat Inspection Branch, ARS. The witness for the AVMA before the House subcommittee on July 18 recommended enactment of legislation that would put poultry inspection in the Meat Inspection Branch, ARS.

The Fourth Annual Symposium on Antibiotics, sponsored by the Division of Antibiotics, F.D.A., Department of Health, Education, and Welfare, will be held Oct. 17-19, 1956, at the Willard Hotel, 14th and Pennsylvania Ave., N.W., Washington, D.C.









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Q

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Q.

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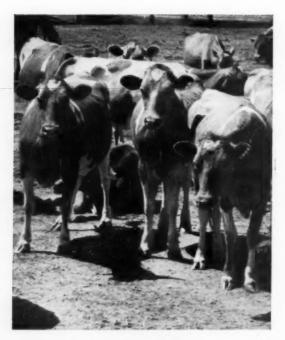
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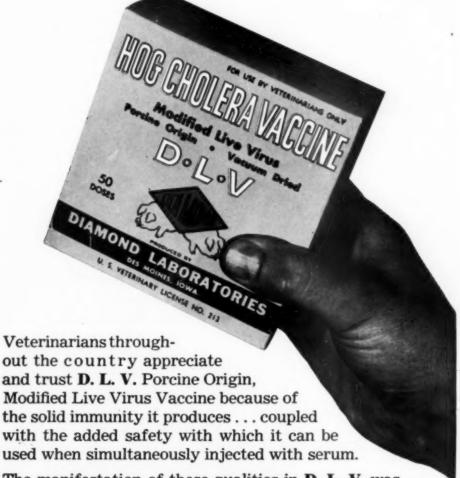
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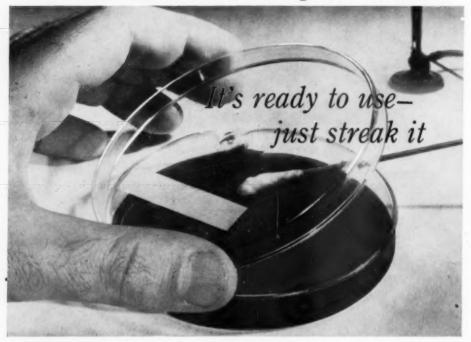


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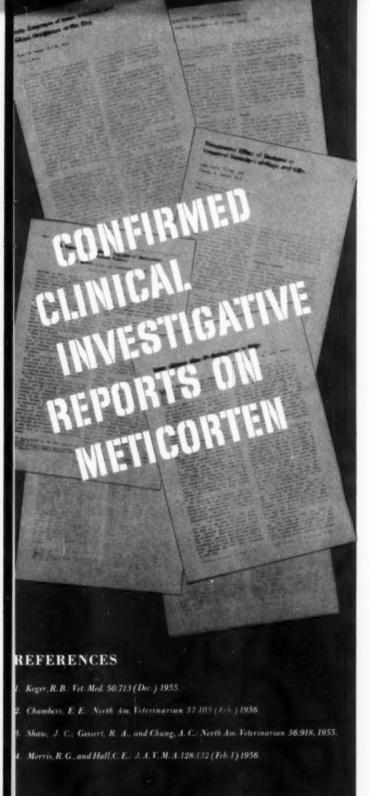
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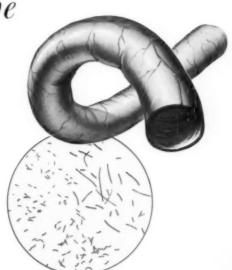
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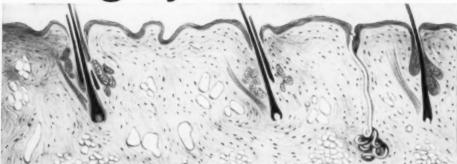
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 Goodman, L., et al.: J. Invest. Dermat. 25:75, 1955.
 Arnetsen, J.: Semana méd. 1:869, 1951.



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Multiple Cartilaginous Exostoses in a Dog

W. C. BANKS, D.V.M., and CHARLES H. BRIDGES, D.V.M.

College Station, Texas

VETERINARY LITERATURE contains several case reports of solitary exostoses in animals, but reports of animals with multiple lesions are extremely rare. The only report found mentioned the diagnosis of multiple cartilaginous exostoses on the ribs of a horse, but it was thought it might be congenital. However, the clinical importance of this pathological condition is enhanced by its unique characteristics and its resemblance to "multiple cartilaginous exostoses" of man which often behaves as a hereditary pathological change in endochondral ossification.

CASE HISTORY

A 9-year-old male dog of mixed breeding but with the general features of the Pekingese, including a slightly achondroplastic skeleton, a characteristic which, however, was not too remarkable in the head, was referred* to this clinic (Texas A. & M. College) because of unusual multiple skeletal deformities which were detectable by palpation and radiographic examination as nodular masses in or on the bones. When presented, the dog had been unable to stand for several days, manifested pain when the spine was palpated, and refused to eat. The owner stated that the dog had experienced difficulty in using its hindquarters some months previously. but had almost completely recovered. Four days prior to presentation, there was a relapse of the paresis in the hindlegs and, by the day before presentation, the animal could not rise and resented physical examination.

Clinical Examination.-The dog, presented on a pallet by the owner, showed little inclination to move. A number of knotty protuberances could be palpated, especially on the ribs and the extremities. The lesion on the left hindfoot (fig. 5) had been present for a number of years, but most of the lesions had become noticeable only recently. He could move his legs, but would not attempt to stand. Hematological studies revealed a slight leukocytosis, but the hematocrit readings and the sedimentation rate were within normal limits. Urinalysis revealed nothing of significance. Radiographic examination was made while the animal was under general anesthesia.

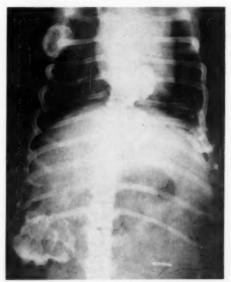


Fig. I—A ventrodorsal radiograph of the rib cage of the dog showing multiple exostoses.

Lewis Rd., Port Arthur, Texas.

Dr. Banks is professor of veterinary radiology and Dr. Bridges is associate professor of pathology at Texas A. & M. College, School of Veterinary Medicine, College Station.

*This case was referred by Dr. Robert Wilcox, 4301



Fig. 2—A lateral view of the same region as in figure 1.

Radiographic Findings.—A radiographic survey revealed skeletal changes in a number of locations (fig. 1 to 3). Lesions were observed in the left tibia and fibula, left femur, right metatarsal, costochondral junctions and heads of five ribs, spinous



Fig. 3—A dorsovolar radiograph of the dog's left hindfoot showing an exostosis of the second metatarsal bone with involvement of the adjoining bone.

processes of several thoracic vertebrae, and the bodies of three cervical vertebrae.

A typical lesion, such as the one on the last rib, can be described as expanding into the soft tissues with considerable disturbance of normal bone architecture. It forms a cauliflower-like outgrowth with a continuation of the normal cortex into the base of the lesion. It is a structureless calciferous mass with scattered areas of ray transparency. Many of the lesions showed an encroachment upon a regional bone.

Necropsy Findings.—Gross examination revealed numerous firm masses on the bones which corresponded to those shown in the radiographs. They consisted of localized eccentric expansions of cancellous bone, which were covered by irregularly nodular excrescences of hyaline cartilage and bone (fig. 4 and 5). They were located at or near sites of normal endochondral ossification, such as the costochondral junction, metaphysis of the long bones of the legs, about the bodies of the vertebrae, and in the spinous processes of the vertebrae. The surfaces of these exostoses had nodular "caps" of hyaline cartilage which were approximately 0.5 to 1.0 mm. thick, and these alternated with thin plates of bone which were approximately 0.1 mm. thick. The outer surface of the cartilage had a vellowish-to-bluish hyaline appearance, whereas the bone appeared brown because the color of the hematopoietic marrow

showed through. A few of the lesions were almost totally ossified.

One lesion, which measured approximately 3 by 4 cm., in the spinous process of the third thoracic vertebra was soft and friable and offered only slight resistance to cutting with a knife. The cut surface was grayish white except for a few small hemorrhagic foci. A few calcareous granules could be palpated in this soft tissue and occasional remnants of the cortical bone and cartilage were discernible.

The other organs of this animal were essentially normal. No exostoses were found on the bones of the head.

Microscopic Findings .- Microscopic examination revealed cancellous bone with fine trabeculae interspersed between apparently normal hematopoietic tissue. Surrounding the cancellous bone were caps of hyaline cartilage alternating with thin layers of bone. There were numerous areas undergoing calcification in the cartilage. Numerous isolated islands of hyaline cartilage, surrounded by bone, were present deep in the areas of cancellous bone. The cells of the cartilage were variable in size, many being larger than normal, and several lacunae contained two to three cells. On the peripheral surface of the cartilage a thin layer of perichondrium was found and, beneath it, a thin layer of young, flattened chondrocytes (fig. 6).

The expanding lesion on the spinous process of the third thoracic vertebra consisted of diffuse sheets of cellular tissue interspersed between old trabecular bone and surrounding the hyaline cartilage of the original exostosis (fig. 7 and 8). This tissue was composed of cells with oval-toelongated vesicular nuclei and variable amounts of cytoplasm, which blended with adjacent cells or formed an irregular stellate outline when separated. In some places, the cells surrounded an irregular pink hyaline material identified as osteoid tissue and, in other places, pale bluish hyaline material was present between the cells. Numerous mitoses and invasions of vascular channels were seen. The neoplastic cells replaced the bone marrow and infiltrated the connective tissues surrounding the exostosis. This neoplastic lesion was diagnosed as a chondrosarcoma.

DISCUSSION

Because of the sparsity of information on multiple exostoses in animals, it is nec-

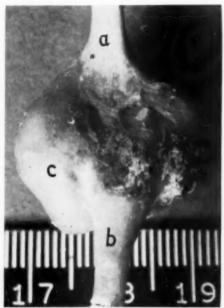


Fig. 4—Medial side of exostosis at costochondral junction of fifth rib; a—shaft of rib, b—cartilage, and c—exostosis.

essary to refer to findings in man. Most writers feel the condition in man occurs more frequently in the long bones. In the case described, an examination of the radiographs shows the lesions to be present in both the long and flat bones.

In differentiating this condition from other bone lesions which occur in the dog, osteomyelitis, osteogenic sarcoma, giant cell



Fig. 5—Composite picture of representative lesions. Exostoses are indicated by arrows; a—left femur, b—tenth rib, c—eighth rib, d—fifth rib, and 3—left hind-

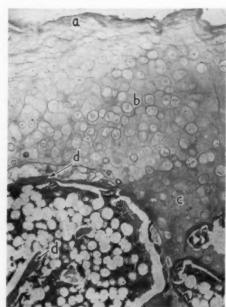


Fig. 6—Section through cartilaginous area of exostosis; a—perichondrium, b—hyaline cartilage, c calcified cartilage, and d—cancellous bone. x 160.

tumors, and skeletal coccidioidomycosis should be considered. The first three of these conditions could possibly show some radiographic similarity in comparing a single lesion. A radiographic bone survey is of value in differentiation, for the dog affected with the other conditions usually shows a single observable focus.

Coccidioidomycosis may present a number of lesions in locations similar to those of multiple exostoses. However, the difference is seen when radiographs of the two conditions are compared. In coccidioidomycosis, the affected bones present a rarifaction or "punched out" appearance. There is also less change in the shape of the bones.

The history of the dog having been in an area where *Coccidioides immitis* is endemic might be of value in differentiation.

The anatomical nature of the lesions in this case suggests the name of "multiple cartilaginous exostoses," a term formerly used in defining an analagous condition in man.2 Synonyms which have been used for the disease in man are "multiple exostoses,"9 "multiple osteogenic exostoses," "hereditary multiple exostosis,"3 multiple ossifying chondromata," "disphyseal aclasia,"4 "hereditary deforming chondrodysplasia,"1 "multiple osteomatosis," and "exostosis disease."7 Heredity plays a role in the condition in man, about two thirds of the cases having a familial history of the disease with males being affected most frequently. The lesions usually come to medi-

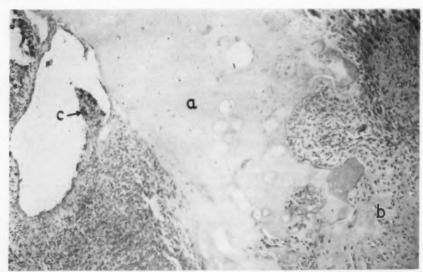


Fig. 7—Chondrosarcoma in exostosis; a—hyaline cartilage of exostosis, b—chondrosarcoma, and c—neoplastic cells in lumen of vessel. x 130.

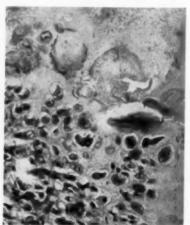


Fig. 8—Area of malignant transformation in an exostosis, x 350.

cal attention between the age of 2 years and the onset of puberty.³ As indicated by the synonym, "hereditary deforming chondrodysplasia," this skeletal malformation produces typical multiple exostoses but, occasionally, it also produces a diminished stature.³

The physical examination of this dog revealed an achondroplastic skeleton, but conclusions on this are thwarted by the frequent occurrence of hereditary achondroplasia in certain breeds of dogs, such as the Pekingese, which are manifested even in progenies produced by crossbreeding.8 The infrequency of multiple exostoses even in achondroplastic breeds suggests that the two conditions are not necessarily related. One author3 stated that the shortening of the long bones in man is not due to the lack of actual growth of the cartilage, but is caused by the cartilage growth being expended laterally in the exostoses rather than longitudinally. He believed that the genesis of the lesion was explained by a combination of the theory of defective modeling of the bone (diaphyseal aclasia) and the concept of perverted periosteal and perichondral activity. A case reported⁶ in a horse also lacks adequate familial history to draw conclusions on the hereditary influence.

The occurrence of malignancy in one of the lesions in this dog parallels the occurrence of such change in similar lesions in man. Chondrosarcomas were reported³ in 3 of 28 cases, nearly 11 per cent. That observation was made at a time when many of the affected persons were young and it was postulated that the percentage of malignancy would be much higher by the time all of them had expired.

The chondrosarcoma in this case appeared quite malignant as indicated by its marked cellularity, anaplasia, mitoses, and invasion of vascular channels, but no metastatic lesions were found in the vital organs. It is believed that lesions may remain locally invasive for years without distant metastases.

SUMMARY

The radiographic appearance and the gross and microscopic pathology of skeletal lesions in a dog with multiple cartilaginous exostoses and supervening chondrosarcoma is described.

The lesions are discussed in relation to the multiple cartilaginous exostoses which have a hereditary background in man. The lack of adequate information precludes an interpretation of the role of heredity in this canine case.

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Frozen dairy products which contain less than 10 per cent of butterfat must be labeled "ice milk" instead of ice cream in the state of Illinois.—Illinois Dept. of Agric., June 4, 1956.

Surgery and Obstetrics

Fracture of the Metacarpal Bones in a Llama

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Urbana, Illinois

An adult, male llama was presented to the University of Illinois Veterinary Clinic, on April 28, 1955, with a fractured left front leg. The injury had occurred as a result of an unloading accident. The animal had caught its foot between the truck and the ramp. It was classified as a comminuted fracture (fig. 1) of the third and fourth metacarpal bones.¹

This exotic animal is a ruminant and, as such, has resting habits similar to cattle. The method it uses to arise and lie down had to be considered. Therefore, a fixation which would allow the animal as much freedom of movement as possible was applied.

The leg was cast in acute flexion by a

From the Department of Veterinary Clinical Medicine, College of Veterinary Medicine, University of Illinois, Urbana.

¹Wichert, Charles K.: Anatomy of Chordates. McGraw-Hill Book Co., Inc., New York (1951): 114.



Fig. I—Radiograph of comminuted fracture of left metacarpal bones of an adult Ilama.



Fig. 2—Radiograph of completed cast, showing extreme flexion of carpus and embedded wire saw. Note re-establishment of periosteal line which denotes healing.

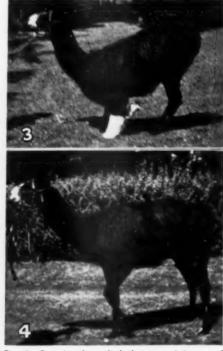


Fig. 3—Cast in place; limb being used in normal rising posture.

Fig. 4—Llama, eight weeks after the limb was fractured, showing the limited extension possible when the cast was removed. Full mobility returned later.

double cast, one over the other, using a quick-drying, plaster of paris bandage.

Procedure.-The leg was cleaned with soap and water and a stockinette applied to the fractured area below the carpal joint. Next, a layer of cotton was wrapped around this part of the leg. The plaster of paris bandages were then applied, with a length of obstetrical wire buried in them to facilitate removal (fig. 2). The leg was then flexed at the carpus and the cast cut away from the flexor surface of the proximal end of the metacarpal bones, in order to bring about complete flexion. With the leg completely flexed at the carpal joint, a large stockinette was fitted over the carpal end in such a manner as to cover the leg to the distal end of the humerus and to the hoof. A light covering of cotton was wrapped around the flexed leg over the stockinette and a loose-fitting plaster of paris cast applied around the whole combination, except for the front of the carpus where a pad of cotton of considerable thickness was

taped to protect the joint from injury (fig. 3).

The double cast was left in place for seven weeks, at which time the outside cast was removed. This was done to start the process of straightening the leg. By leaving the lower cast, it provided some weight to aid the animal in exercising the leg and, thereby, begin restoring mobility of the carpal joint. The remainder of the cast was removed in the eighth week.

After removal of the cast, the leg remained in a partially flexed position with limited mobility (fig. 4). By the end of the tenth week, considerable improvement was evident and the carpus, although restricted in movement, was allowing more extension. In the eleventh week, the animal was returned to the owners (a circus company) and, in a recent communication, they state that the leg is now functionally and anatomically normal.



These 7-day-old quadruplet purebred Aberdeen Angus calves, when born on March 10, 1956, each weighed within a few ounces of 28 lb. When 5 weeks old, each weighed within a few ounces of 92 lb. All are females and from all indications they appear to be identical. Their dam, 5 years old, had previously given birth to 3 normal, single calves. The odds against bovine quadruplets are said to be about 800,000 to 1.—Submitted by Carey W. Thornton, Jr., D.V.M., Robertsdale, Ala.

Use of Urinary Retention Catheter in Small Animals

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Apollo, Pennsylvania

A retention catheter, to permit continual drainage of the bladder, avoids repeated irritation of the organs after surgery or instrumentation and in inflammatory conditions. It speeds recovery and adds to the patient's comfort. This catheter also is useful after prolonged bladder distention which leaves the organ fatigued or paralyzed. It is seldom required in females.

THE MALE CAT

A male cat having difficulty in urinating should be anesthetized and the urethra explored. If a calculus is found, often about 2 cm. from the external orifice, a blunted hypodermic needle, gauge 18 or 19, should be inserted and an attempt at dislodgment made by injecting nupercaine® solution (1:500) under slight pressure, while holding the urethra tight around the needle.

If this is not successful after repeated attempts, urethrotomy is indicated. For this, a handy small grooved director can be made from a 19-gauge needle by grinding one side until about 1 inch of the lumen is exposed at the end. This needle is inserted to the obstruction as a director and the urethra is incised with a No. 11 Bard-Parker blade.

When the obstruction has been removed, a retention catheter of size 24 plastic tubing, stiffened with tonsil snare wire, is inserted into the bladder. The urethra in a 7- to 10-lb. cat is usually about 4 inches long. The catheter should just reach the neck of the bladder and ½ inch should be exposed to be sutured, after removal of the stilet, to the inner wall of the prepuce with fine stainless steel wire.

The catheter may be left until healing is presumed to be complete, probably in four to six days. During this time, antibiotics should be administered and attempts made to reduce the pH of the urine to the acid side.

When the catheter is to be removed, the exposed end is grasped with forceps first, to prevent its withdrawal into the urethra where it is inaccessible, then the suture is cut.

Dr. Barchfeld is a general practitioner in Apollo, Pa.

THE MALE DOG

Obstruction of the urethra in male dogs is usually by calculi and at the proximal end of the os penis. While a urethrotomy here will heal without sutures, it will heal much faster (5 days versus up to 5 weeks) and with less stricture if sutured immediately to prevent recurrent hemorrhage.

The operative technique consists of: clamping a tongue forceps on the urethra and collateral blood vessels at the ischial arch to provide a dry field; inserting the largest suitable catheter to the obstruction; incising at this point through the skin, fascia, and urethral wall to remove the calculus (i); and then gently passing the catheter into the bladder, removing the forceps when encountered. However, if there are a number of calculi in the urethra, the forceps should be released long enough to allow escaping urine to flush them out through the incision.

The incision is then cleansed and closed, using two or three layers of fine wire sutures in the fibrous overlying tissues without penetrating the urethral mucosa. Heavier wire sutures are placed in the skin and the ends are left long enough to discourage self-mutilation.

The prepuce is retracted, the plastic tube is cut and sutured to the end of the penis with fine wire. If necessary, the bladder can be invaded to remove other calculi.

With the proper care, the wound should heal in five days. The catheter is then removed and the dog sent home.

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III-Effects of Spinal Anesthesia

A study of 10,000 cases in which spinal anesthesia was used in man indicated that 11 per cent suffered headaches later, most of them within two days following the injection. This was believed to result from loss of cerebrospinal pressure due to needle-puncture leakage, the incidence varying directly with the size of the needle used. A 22-gauge needle is usually preferred but headaches can be practically eliminated by using a 26-gauge needle. Because of poor vascularity, the dura does not heal readily and leakage may continue for 14 days after use of larger needles.—J.Am.M.A., June 16, 1956.

Maintenance of Lactation with Dihydrotachysterol in Thyroparathyroidectomized Rats

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Army Chemical Center, Maryland

PARTURIENT PARESIS is a common disease in dairy cows (milk fever) and bitches (eclampsia). In a comprehensive review by Hibbs,1 the theories concerning the etiology of this disease with its postpartum hypocalcemia are discussed, and it is a commonly accepted theory that a degree of hypoparathyroidism is an etiological factor. Between lactations and during pregnancy, the parathyroid glands are relatively quiescent and, when the heavy flow of milk begins, shortly after parturition, with the subsequent withdrawal of calcium from the circulation, the secretion of parathyroid hormone may not be sufficient to prevent paresis.

Parturient paresis in cattle is commonly treated by either injecting calcium salts parenterally or injecting air into the udder to arrest the secretion of milk. However, the calcium treatment often must be repeated since the blood calcium does not always remain above critical levels a day or two after treatment. The injection of greater quantities of calcium salts into cows did not result in a higher blood calcium concentration a day later than found in cows given a lower dosage.²

Some progress has been made in preventive therapy for parturient paresis in cows. The incidence of this disease in dairy cows was reduced when a low-calcium, high-phosphorus diet was fed, particularly during late pregnancy.3 This treatment was thought to keep the parathyroid glands active during pregnancy and, thus, able to cope with the suddenly increased requirements of lactation. While the incidence of the disease was not reduced by the feeding of moderate doses of vitamin D during the last month of pregnancy,4 large doses of vitamin D, 5 to 30 million units given three to eight days prepartum, may have reduced the incidence of the disease and

increased the postpartum blood calcium level.⁵

Dihydrotachysterol (A.T. 10, hytakerol, parterol, or calcamin) is an activated ergosterol derivative found to have greater hypercalcemic properties and greater toxicity than vitamin D.⁶ Hypoparathyroidism in man has been treated successfully with dihydrotachysterol.⁷⁻⁹

Thyroparathyroidectomized dogs have been maintained for extended periods by dihydrotachysterol administration, and the hypercalcemic effects of this compound were found to last longer than those of parathyroid hormone. In Inasmuch as dihydrotachysterol has been found capable of raising the blood calcium concentration of lactating goats, In this compound may be of value as a supplemental treatment with the injection of calcium salts in the treatment of parturient paresis, possibly avoiding the necessity of repeated treatments.

It was the purpose of this study to determine the ability of dihydrotachysterol to maintain lactation in thyroparathyroid-ectomized rats. The rat has the advantage of being an efficient milk producer, and the growth and survival of progeny are a good index of lactation.¹²

METHODS

Wistar rats, 8 to 12 months old, were used in an environmental temperature controlled at 75 F., with the relative humidity at 45 per cent. A commerical rat diet was fed ad libitum. Females were thyroparathyroidectomized using ether anesthesia by the method described by Farris and Griffith. Surgery was performed 12 to 24 hours postpartum, and rats showing signs of surgical shock one day after surgery were discarded from the study. The progeny were weighed weekly from birth until weaning at 3 weeks.

Rats were separated at random into the following groups: group A, intact controls; group B, thyroparathyroidectomized females receiving iodinated casein* in the feed at the level of 0.02 per cent; and group C, thyroparathyroidectomized females receiving iodinated casein in the feed at the level of 0.02 per cent and subcutaneous injections of 0.02 per rat of dihydrotachysterol in oil three

This work was done at the Chemical Corps Medical Laboratories, Army Chemical Center, Md.

The authors gratefully acknowledge the technical assistance of Mr. Matthew Maggio of this laboratory.

Dr. Borgman's present address is Skyland Animal Hospital, Asheville, N. Car., and Mr. Rumbaugh's is Agronomy Department, University of Nebraska, Lincoln.

^{*}Iodinated casein is a product of Cerophyl Laboratories, Kansas City, Mo., and is called "protamone." This product contains an assayable amount of thyroxine.

times per week. Treatments were started at parturition and continued three weeks.

RESULTS

Removal of the parathyroid glands from otherwise normal female rats in preliminary studies resulted in less intense signs than observed in other species, as also noted by others.13 Following surgery, nonlactating females showed mild tremors of the mandibular muscles, general neuromuscular excitability, and were more difficult to handle. After surgery, lactating females not receiving dihydrotachysterol usually showed more intense signs such as general muscular fasciculation and sometimes clonic convulsions; however, the intensity of the signs could not be correlated with the ability of the females to raise litters. When these thyroparathyroidectomized lactating females received dihydrotachysterol, they showed only mild signs, or none at all.

The percentage of thyroparathyroidectomized rats raising all or part of a litter and the litter size were larger when dihydrotachysterol was given (table 1). The weight gain of the surviving progeny did not differ significantly between intact females, thyroparathyroidectomized females, and thyroparathyroidectomized females receiving dihydrotachysterol, although the weight gain tended to be less in both of the latter groups (fig. 1). Thus, it appeared that part of a litter would be lost, when sufficient milk was not available, rather than the entire litter being maintained at a reduced rate of growth.

The data were tested for significance (p <0.05) with the number of rats raising litters and the survival of progeny being analyzed by *chi*-square, and the body weights of the progeny by co-variance adjusting for litter size.¹⁴

DISCUSSION

The growth rate observed was similar to that reported for normal litters of white rats by S. Brody¹² and E. B. Brody.¹⁵ S. Brody reported that baby rats died within four days after the cessation of lactation, and that the number of surviving progeny of normal rats was directly proportional to the amount of lactation.

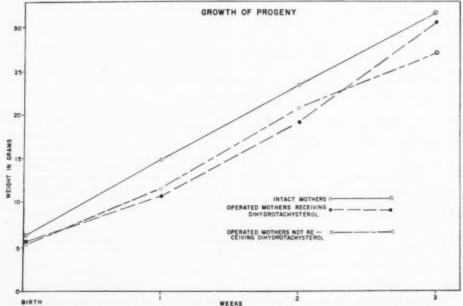


Fig. 1—The average weight of the surviving progeny of rats. The groups were identified in table 1 as follows: intact controls, group A; thyroparathyroidectomized rats receiving iodinated casein, group B; and thyroparathyroidectomized rats receiving iodinated casein and dihydrotachysterol, group C. There were no significant differences (p <0.05) between the progeny weights of any of the groups.

TABLE I—Rats Raising Litters and Survival of

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		Weeks postpartum						
Group	1 week	2 weeks	3 weeks					
Rats Raising A	Il or a Portio	n of Litter						
Group A*	10/10+	10/10	10/10 (100%)					
Group Be	5/10	5/10	5/10 (50%)					
Group C*	10/12	10/12	10/12 (83%)					
Survival of Pr	ogeny							
Group A®	65/73**	65/73	65/73 (89%)					
Group B*	33/85	33/85	33/85 (39%)					
Group C*	52/91	50/91	49/91 (54%)					

*Group A, intact controls; group B, thyroparathyroidectomized rats receiving iodinated casein; and group C, thyroparathyroidectomized rats receiving iodinated casein and dihydrotachysterol.

The numerator indicates the number raising all or a portion of their litter; the denominator, the number giving birth to live young.

**The numerator indicates the number of surviving progeny; the denominator, the number of live progeny at birth.

The number of rats raising litters in groups A and C was significantly (p <0.05) greater than in group B. There were also significant differences among the number of progeny raised among groups A, B, and C.

Since it has been shown that reducing the litter size of normally lactating rats results in more rapid growth of the progeny, 12,15,16 it may be reasoned that the loss of progeny found in this study was the result of reduced lactation. There was no increase in the rate of growth of the progeny of thyroparathyroidectomized dams that lost parts of litters. The level of iodinated casein fed has been reported to produce mild thyroidal stimulation in rats 17 and, thus, compensate for the removal of the thyroid glands.

The results would indicate that dihydrotachysterol aided in the maintenance of lactation in the thyroparathyroidectomized females (table 1).

In a limited number of cows with parturient paresis and dogs with eclampsia which were treated clinically with dihydrotachysterol, in addition to the parenteral injection of calcium salts, no repeat treatments were necessary. However, the number of cases was too few for valid conclusions. No toxic effects were observed in cows or dogs treated with dihydrotachysterol.

SUMMARY

When the thyroid and parathyroid glands were removed from lactating rats and the thyroid function replaced by iodinated casein feeding, dihydrotachysterol injections increased the number of rats raising litters and the number of surviving progeny. However, the weight of the surviving

progeny did not differ significantly whether the dams were intact, thyroparathyroidectomized, or thyroparathyroidectomized and receiving dihydrotachysterol. The results indicated that dihydrotachysterol administration aided in the maintenance of lactation in the absence of the parathyroid glands, and possible applications to the treatment of parturient paresis in cows and eclampsia in bitches were discussed.

P-f-r-

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Clinical Data

New Developments in Hog Cholera Immunization

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THE NEW DEVELOPMENTS in hog cholera immunization which have recently received the most attention are the modified living virus vaccines. This discussion will be concerned with the modified living virus, rabbit-origin, vacuum-dried, swivax.®

First, it may be well to explain the meaning of the words "modified," "fixed," "attenuated," and "inactivated." "Modified" means modified in pathogenicity, usually artificially and purposefully, to a point where the virus can be injected into the susceptible animal without producing disease. "Fixed," a word applied to rabies virus, means fixed in its characteristics (more particularly, its incubation period). "Attenuated" is an ambiguous term meaning variously: thinned, weakened, or killed.

virus (smallpox). Other viruses have been artificially and purposefully rendered less virulent.

In the last century, the virus of rabies was reduced in pathogenicity by 50 consecutive serial passages intracerebrally in the rabbit. In 1937, yellow fever virus was modified by serial passage in the developing chick. Nakamura, in 1938, modified the virus of rinderpest by serial passages in the rabbit. In 1939, Zichis, of our laboratories, attempted to modify the virus of hog cholera by serial passages in sheep. He was able to passage it for ten times before he apparently lost it, since it would no longer either infect or immunize hogs.

In 1946, Baker, and also Koprowski and coworkers, independently announced the modification of hog cholera virus by serial passages in the rabbit. Since then, several other viruses have been modified by various methods, including canine distemper and rabies by egg passages and hog

TABLE I-Development of the Swivax Virus

-		Pig→ rabbit→	Animal pa pig→ rabbit→ pig		rabbit→ pig→				
	rabbit—			to rabbit-		*			
Effect on the pig of further passages of the virus 5 passages $+5 = 10$ $+30 = 40$ $+50 = 90$ $+100 = 190$ $+100 = 290$ $+110 = 400$									
All developed cholera.	+5 = 10 50% developed cholera.	No deaths, but febrile response and leukopenia.	+50 = 90 No deaths; 50% febrile response; some bogs slow.	+100 = 190 No deaths; fewer febrile responses and leukopenia; none	+100 = 290 No deaths; no illness; some transitory febrile responses and	No deaths; no illness following challenge dose of virulent virus.			

noticeably ill.

Dorland¹ says, "To render thin or to render less virulent." "Inactivated" refers to a virus which has been rendered completely inactive, so that it does not multiply or grow. Inactivation is usually accomplished by addition of chemicals (formalin, phenol) or by physical means (heat, ultraviolet light). As a rule, living vaccines stimulate a more prompt and durable immunity of a higher degree than do inactivated vaccines.

Immunologists have long sought naturally avirulent strains of viruses which were immunogenic. Perhaps the nearest approach is the use of vaccinia virus (cowpox) for immunization against variola cholera and infectious canine hepatitis by passage in tissue culture.

leukopenia.

THE DEVELOPMENT OF THE SWIVAX VIRUS

The history of the development of the swivax virus (table 1) is of interest. The virus was first adapted to grow in the rabbit by alternating passages between the rabbit and pig. Apparently by this process, the virus particles most adapted to survive in the rabbit were selected and propagated in the pig until, eventually, the virus would propagate in the rabbit. It has now been transferred for over 400 consecutive rabbit passages. There was a gradual decrease in virulence for the pig, as the number of rabbit passages increased, but no increase in virulence for the rabbit. The virus still has no noticeable effect on rabbits, and the only method of detecting the presence of the modified virus is to inject it into susceptible pigs and later

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TABLE 2—Results of Controlled Laboratory Studies to Determine the Immunizing Qualities of Swivax

Status of pigs studied	No. of pigs studied	No. sickened from all causes prior to challenge	No. challenged with virulent hog cholera virus	No. sickened from all causes subsequent to challenge	No. died, all causes
Vaccinated with swivax	2,313	3	2,610	47 (1.8%)	15 (0.6%)
Unvaccinated controls	696	0	696	682 (97.9%)	682 (killed)

determine whether they have become immune to challenge with virulent virus.

CHARACTERISTICS OF THE VIRUS

The results of a series of studies of the safety and efficacy of the swivax virus were tabulated (table 2). When compared with immunizing agents for most diseases, this virus is remarkable in that it is almost 100 per cent effective. For contrast, the Salk poliomyelitis vaccine was considered a success at about 80 per cent effectiveness.

TABLE 3—Results of Challenge with Virulent Hog Cholera Virus 78 to 91 Days After Treatment

				Results	of challen	ge
No. of Pigs	Dose of swivax (cc.)	Dose of serum (cc.)	Pigs died	Sick	Tempera- ture reaction	Re- mained well
20	2	P-1-0	0	0	1*	20
20	2	15	0	0	0	20
20	2	30	0	0	0	20
10		15	10	10	10	
16		****	14	15	15	1

*One pig had temperature of 104.2 F. for one day.

These results also demonstrate its safety, since none of the vaccinated pigs which sickened either before or after challenge showed evidence of cholera. The safety and efficacy of the product is further demonstrated in field trials (table 9).

Efficacy when Administered Simultaneously with Serum.—An experiment was designed to test the immunogenic value of the virus when given with serum (table 3). A herd of susceptible pigs was divided into five groups. The first group was injected with vaccine alone, the second with vaccine and 15 cc. of serum, the third with vaccine and 30 cc. of serum, the fourth with 15 cc. of serum alone, and the fifth was held as uninoculated controls. All the pigs remained well, and challenge was delayed for about three months until all the passive immunity from the serum would be exhausted

After challenge with virulent virus, 15 of 16 uninoculated controls proved susceptible, indicating first that the herd was susceptible, second that the challenge virus was virulent, third that the animals had not been accidentally exposed to virulent virus during the test period, and fourth that unvaccinated animals had not been immunized or infected by contact with vac-

TABLE 4—Results of Challenge* of Pigs Vaccinated with Swivax at Various Intervals After Administration of Serum^o

		Dose	Dose	Dose challenge	Results of challenge		
Test group	No. pigs	serum (cc.)	swivax (cc.)	virus (cc.)	Pigs died	Sick and recovered	Remained well
Swivax simultaneously with serum	8	35	2	2	0	0	
Swivax 1 week after serum	10	35	2	2	0	0	10
Swivax 2 weeks after serum	10	35	2 _	-2	10	0	9
wivax 3 weeks after serum	8	35	2	2	0	0	8
wivax 4 weeks after serum	8	35	2	2	0	0	8
Swivax only	4	None	2	2	0	0	4
Serum only	6	35	None	2	4	1	1
No treatment	8	None	None	2	8	0	0

*All pigs were challenged 75 to 83 days after administration of serum.

*Died six days after challenge; few lesions suggestive of cholera; hemolytic Streptococcus isolated from spleen and heart blood.

TABLE 5—Degree of Active Immunity Demonstrated by Pigs when Challenged with Virulent Hog Cholera Virus

	Dose	Dose	Dose	of challeng	te virus				
No. of of of of swivax serum pigs (cc.) (cc.)	2 cc.	10 cc.	Hyperim- munizing 5 cc./lb.	Pigs died	Sick	Tem- perature reaction	Remained well		
11	2		11			0	0	10	11
5	2	0000		5	99.5	0	0	0	5
4	2	****	****	****	4	0	0	0	4
11	2	15	11	****	****	0	0	0	11
5	2	15	****	5	****	0	0	0	5
4	2	15		****	4	0	0	0	4
11	2	30	11	****	4000	0	0	0	11
5	2	30	0100	5	2010	0	0	0	5
4	2	30	****	F112	4	0	0	0	4
10	0000	15	10		****	10	10	10	0
16			16			14	15	15	1

*One pig had temperature of 104.2 F. for one day.

cinated animals. Also, after challenge, 10 of the 10 pigs which received only serum proved susceptible, indicating that the passive immunity was exhausted. All other animals which had received either vaccine alone or in combination with serum were immune.

Efficacy when Administered After Serum.—To test the effect of the pre-existence of a passive immunity upon the active immune response, a herd of susceptible pigs was divided into eight groups (table 4). Some groups were given vaccine simultaneously with serum and at one-, two-, three-,

and four-week intervals after serum. Other groups were given serum alone or vaccine alone, and a control group received no treatment. When challenged about two and one half months later, the controls were susceptible and the vaccinated pigs were immune.

Degree of Immunity Produced by the Vaccine with and Without Serum.—Hogs which had been given vaccine alone, or vaccine and serum simultaneously, were immune to large doses of challenge virus. The virus used for hyperimmunizing swine contains about 1 million m.l.d. per milli-

TABLE 6-Swine Passage of Swivax Virus

Swine passage	Pig (No.)*	Inoculum	Safety results	Days between vaccination and bleeding	Days between vaccination and challenge*	Results of challenge
FIRST SERIE	S					
1st	A1 & A2	Swivax	2 OK	7	9	2 immuno
2nd	B1 & B2	Blood of A1 & A2	2 OK	7	12	2 immuno
3rd	C1 & C2	Blood of B1 & B2	2 OK	7	7	2 immune
4th	D1 & D2	Blood of C1 & C2	2 OK	7	12	2 immune
5th	E1 & E2	Blood of D1 & D2	2 OK	7	12	2 immuno
6th	F1 & F2	Blood of E1 & E2	2 OK	7	12	2 immune
7th	G1 & G2	Blood of F1 & F2	2 OK	7	12	2 immuno
8th	H1 & H2	Blood of G1 & G2	2 OK	7	12	2 immune
9th	I1 & I2	Blood of H1 & H2	2 OK	7	12	2 immuno
10ch	J1 & J2	Blood of I1 & I2	2 OK	7	12	2 immuno
11th	K1 & K2	Blood of J1 & J2	2 OK	7	12	2 immune
12th	L1 & L2	Blood of K1 & K2	2 OK	7	13	2 immune
SECOND SEI	RIES					
1st	A3 & A4	Swivax	2 OK	7	9	2 immuno
2nd	B3 & B4	Blood of A3 & A4	2 OK	7	10	2 immune
3rd	C3 & C4	Blood of B3 & B4	2 OK	7	13	2 immune
4th	D3 & D4	Blood of C3 & C4	2 OK	7	9	2 immune
5th	E3 & E4	Blood of D3 & D4	2 OK	7	16	2 immune
6ch	F3 & F4	Blood of E3 & E4	2 OK	7	18	2 immune
7th	G3 & G4	Blood of F3 & F4	2 OK	7	27	2 immune
8ch	H3 & H4	Blood of G3 & G4	2 OK	7	16	2 immune
9th	13 & 14	Blood of H3 & H4	2 OK	7	10	2 immuno
10th	J3 & J4	Blood of I3 & I4	2 OK	7	11	2 immuno
11th	K3 & K4	Blood of J3 & J4	2 OK	7	15	2 immune
12th	L3 & L4	Blood of K3 & K4	1 OK, 1 di	ied† 7	18	1 immune

*The virulence of the challenge virus and susceptibility of the test pigs was demonstrated by challenging part of each herd.

*This pig died of a prolapsed rectum.

liter, thus a 100-lb. shoat, given 5 cc. per pound, was challenged with 500 million m.l.d. of virus. Since it is almost physically impossible to exceed this dosage, it appears that the active immunity produced by the vaccine can not be broken. This finding is exceptional because immunity to most animal diseases, including those of man, can be broken if the challenge is sufficiently severe.

Absence of Contact Transmission.—Numerous experiments have indicated that the swivax high-passage virus is not transmitted from pig to pig. If it were, one would expect that contact animals would be infected or immunized. For example, in several tests (tables 1-5) the vaccinated pigs were in intimate pen contact with the nonvaccinated pigs and, almost without exception, the nonvaccinated pigs remained well until after challenge with virulent virus, when they proved susceptible. This

is important, since it allows vaccination of a part of a herd without infecting the other pigs or the premises. It, therefore, fulfills the logical qualification implied by Hendershott⁷ when he asked, "Can you take the modified virus vaccine, spray it over a group of susceptible shoats, and not have cholera develop among them?"

Fixed Characteristics.—One might ask, if the virus has been reduced in pathogenicity by rabbit-to-rabbit passage, may it not gain virulence by pig-to-pig passage? To investigate this, blood of a recently vaccinated pig was transferred to a susceptible pig for 12 consecutive passages. In each case, the pigs remained well and were immunized. These results were confirmed by a second series of similar passages (table 6). Apparently, this virus is now truly fixed in its characteristics.

Absence of Persistence of the Virus in the Pig.—To determine if the virus is

TABLE 7-Absence of Persistence of the Virus in the Pig

	Group	No. of pigs	Status	Results of inoc.	Days between vacc. and collection of urine and blood	Days between vacc. and challenge	Results of challenge
1 (6	wk. old)	5	Contact controls.	5 OK		10 weeks	3 susceptible, 1 immune, 1 killed acci- dentally
	В	4	Vaccinated field dose swivax.	4 OK	4 weeks	10 weeks	4 immune
II (5	wk. old)	1	Contact control.	1 OK	****	10 weeks	1 susceptible
	В	4	Vaccinated field dose swivax,	4 OK	4 weeks	10 weeks	4 immune
ш	A	2	Injected 2 cc. s.c. pool urine from group IB.	2 OK	•••	6 weeks	2 susceptible
	В	2	Injected 2 cc. s.c. pool blood from group 1B.	2 OK	•••	6 weeks	2 susceptible
IV							
	A .	2	Injected 2 cc. s.c. pool urine from group IIB.	2 OK	Assets	6 weeks	2 susceptible
	B di	2	Injected 2 cc. s.c. pool blood from group I'B.	2 OK	***	6 weeks	2 susceptible
V		1	Susceptibility control.	1 OK	****	6 weeks	1 susceptible

TABLE 8-Safety for Pigs Under Stress

No		Amoun	t of inoculum	Safety	Results of	
pigs injected			Cortisone	results	challenge	
4	8-10 wk.	1 dose	None	OK	Immune	
4	8-10 wk.	1 dose	600-1,200 mg.	OK	Immune	
4	8-10 wk.	None	600-1,200 mg.	OK	Susceptible	

harbored in the vaccinated pig, groups of young pigs were vaccinated and, one month later, blood and urine from these pigs were injected into susceptible pigs. The latter pigs were neither infected nor immunized (table 7), indicating that the virus did not persist.

TABLE 9-Summary of Field Trials

No. of pigs: Studied	8,746	
Tested for susceptibility		(2.2%)
Susceptible	192	(100%)
Vaccinated	8,554	
Died from all causes	46	(0.54%)9
Tested for immunity by challenge		
with virulent virus	188	(2.2%)
Immune	188	(100%)

*Causes of death: pneumonia, 23; streptococcic septicemia, 7; complications after castration, 6; eperythrozoonosis, 2; enteritis, 1; swine erysipelas, 1; swine influenza, 1; gas gangrene, 1; unknown, 4.

Safety for Pigs Under Stress. 10—Another experiment (table 8) was designed to test the effect of the virus on pigs under certain stress conditions, artificially induced by administration of cortisone. Young pigs which received the virus alone, or in combination with cortisone, remained well and were immune to challenge.

SUMMARY

A discussion of the development and characteristics of the swivax® modified living hog cholera virus is given. The properties of the virus are as follows:

The virus vaccine produces a solid immunity in pigs without harming them.

The vaccine is immunogenic when administered simultaneously with serum.

An active immunity is produced in pigs which already have a passive immunity.

The degree of immunity produced will withstand hyperimmunization.

The high-passage virus is not spread from vaccinated pigs to other pigs or to the premises; it is apparently "fixed" in its characteristics; and it does not persist in the vaccinated pig.

The simultaneous administration of the modified virus and cortisone did not harm pigs.

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Pigs Gain Best when Kept Cool

When two lots of shoats were fed under similar conditions except that one lot had a cooling wallow, at the University of Illinois, those with no wallow averaged 1.46 lb. of gain daily and ate 386 lb. of feed for 100 lb. of gain, while those with a wallow averaged 1.8 lb. of gain daily and ate 351 lb. of feed for 100 lb. of gain. Those without a wallow seldom came out of the shade to eat between 8 a.m. and 5 p.m., while the others, after cooling in the wallow, ate frequently. On hot days, the temperatures of those with a wallow averaged about one degree less than the other group.—Prairie Farmer, June 16, 1956.

Aftosa Vaccine Production Studies

Massive edema was provoked in each flank of a cow, in France, by subcutaneous injection of sterile culture mediums. The cow was then infected intralingually with foot-and-mouth disease (aftosa) virus, strain A₅, and was destroyed when the first vesicles formed. The edematous fluid (12 liters) contained virus which appeared to be attenuated and had immunizing properties.—Vet. Bull., June, 1956.

What Is Your Diagnosis?

Because of the interest in veterinary radiology, a case history and accompanying radiographs depicting a diagnostic problem are usually published in each issue of the JOURNAL.

Make your diagnosis from the picture below—then turn the page

History.—An American Saddle Horse gelding, 3 years old, had an enlargement on the anterior surface of the fetlock joint which seemed to be attached to the underlying bony structures. The horse showed no evidence of lameness but was presented for an evaluation of the blemish.



Figure 1

(Diagnosis and findings are reported on next page)

Here Is the Diagnosis

(Continued from preceding page)

Diagnosis.—Exostosis (osteophyte) of the dorsoproximal eminence of the first phalanx.

Comments.—Horsemen often refer to this condition as a "high ringbone." According to Guard, in the consideration of ringbone lameness "our main problem is primarily concerned with mechanical injuries at the points of attachment of collateral ligaments. Such mechanical injury may be a single, more-or-less violent sprain followed by improper care, or it may be a continued chronic type of irritation (strain). Many horses have noticeable ringbone enlargements that are inactive and not responsible for any symptoms of lameness."



Figure 2

Our readers are invited to submit case histories, radiographs, and diagnoses of interesting cases which are suitable for publication.

This case was submitted by Drs. H. J. Hardenbrook and John P. Manning, Department of Clinics, University of Illinois.

¹Guard, W. F.: Surgical Principles and Techniques. 3rd ed. W. F. Guard, 2274 Yorkshire Road, Columbus 21, (1951):117-118.

Stomatitis of Cattle and Horses Due to Yellow Bristle Grass (Setaria Lutescens)

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BECAUSE of the increase and rapidity of travel and transportation today and the speed with which the agent of an infectious disease can be disseminated by this means, the importance of recognizing the cause of a stomatitis in livestock can not be overemphasized. A stomatitis characterized by erosions of the mucous membranes of the mouth is always disconcerting to the veterinarian because of the possibility of it being an exotic disease (foot-and-mouth or other vesicular diseases, bluetongue, rinderpest).1 Mouth lesions in cattle further complicate the diagnosis of mycotic stomatitis, mucosal disease, viral diarrhea, and muzzle disease which in themselves are not too well defined. 3-5 This report describes a stomatitis of cattle and horses which was proved to be caused by yellow bristle grass.

HISTORY AND CLINICAL DATA

In December, 1952, an inquiry was made by an owner to the California State Division of Animal Industry regarding the occurrence of peculiar mouth lesions and poor milk yields in a herd of dairy cattle. A visit to the premises was made the same day by one of us with a representative of the Bureau of Livestock Disease Control* to insure that the condition was not a vesicular disease. The herd consisted of 60 milking cows and 4 calves. About 40 of the animals exhibited some salivation. Inspection of the cattle revealed that all had erosions of the mucous membranes of the mouth, but no increase in body temperatures or lesions of the feet were observed. The owner reported the condition had existed for the past two or three months. Examination of a 2-month-old calf in a

nearby stanchion revealed erosions on the lateral aspect of the attachment of the tongue and another on the buccal mucosa opposite the molar teeth. The latter contained a caseous exudate and a large amount of tightly packed barbs. Inspection of the hay revealed that it contained a considerable quantity of yellow bristle grass.

The owner also revealed that a horse on a neighboring ranch suffered from a similar condition. It was learned that the horse was fed the same hay and soon developed an ulceration about 1.0 cm. in diameter on the ventral surface of the tongue about 2.5 cm. from the tip. The erosion observed was healing, inasmuch as the incriminated hay was withheld once the owner noted salivation and the mouth lesion.

Samples of the hay from the outbreak were submitted+ for identification. The incriminated plant was identified as Setaria lutescens, one of four species of bristle grasses found in California. Setaria lutescens is also commonly known as yellow bristle grass, bristly foxtail, foxtail millet. yellow foxtail, or pigeon grass. According to the federal hay standards, early-cut foxtail grass (Setaria spp.) in alfalfa is considered a grass hay and not a foreign material but, when the plant becomes older, it does become injurious. An analysis of the hay submitted showed it, by mechanical separation, to contain 1.8 per cent of S. lutescens by weight.

During the course of this investigation, it was reported, that several cases of stomatitis in cattle and sheep had occurred during the succeeding three months in the Modesto area of the San Joaquin Valley, approximately 80 miles from the premises reported upon. Salivation, deep ulceration on the dorsal surfaces of the tongue, and proliferating lesions on the dental pad and lower gums, with no fever, foot lesions, or lameness were reported and, in one in-

From the School of Veterinary Medicine, University of California, Davis.

The authors acknowledge the assistance of Dr. S. Saperstein, of the Department of Bacteriology, for isolating and propagating the molds used in the testing procedure, and of Dr. D. Cordy for preparation and interpretation of the histological sections.

^{*}Dr. B. B. White, Bureau of Livestock Disease Control, Division of Animal Industry, California State Department of Agriculture.

[♦]To Miss Margaret K. Bellue, weed and seed botanist, California State Department of Agriculture.

[‡]By Dr. C. B. Bills, district veterinarian, California State Bureau of Livestock Disease Control.



Fig. 1—Mouth lesions in calf, 4 months old, fed the incriminated hay for 15 days. Notice gingival erosions below incisors, bleeding erosions on roof of mouth following removal of the barbs, and the hypertrophic rim around the erosion on the dental pad.



Fig. 2—Large ulcer, on lateral aspect of the tongue of the calf, reproduced by feeding hay containing Setaria lutescens.

stance, a large ulcer in the throat of a cow. Inspection of the hay revealed large amounts of yellow bristle grass.

Although yellow bristle grass has been known to exist in California and plant awns have been previously reported as the cause of stomatitis,^{2,6} its injurious nature was apparently of little or no concern. Explanation for its sudden appearance and reporting is not known; however, the unusually dry fall may have had an effect upon the character or the prevalence of the plant. A more logical explanation is that attention was focused on any mouth condition in livestock due to the recent national outbreak of vesicular exanthema and more care was devoted to differentiation from similar diseases.

EXPERIMENTAL STUDIES AND RESULTS

Virus Study.—To eliminate the possibility of a vesicular disease, some of the caseous material from the calf and material curetted from the margins of the erosions of some of the cattle were brought back to the laboratory. The material was prepared as a 20 per cent suspension in buffered saline, pH 7.4, and inoculated intradermalingually into a calf and intradermally into the tarsal pads of 6 guinea pigs. No febrile response or lesions developed in the animals during the following ten days.

Feeding Trials.—To determine whether the condition could be reproduced, 1/4 ton of hay was purchased from the owner and brought to the laboratory. One apparently normal calf, 4 months of age, was fed the hay and was examined daily. By the seventh day, a pink erosion was noticed at the alveolar border of the gums. The erosion enlarged considerably during the succeeding 12 days. Multiple lesions were found in various parts of the calf's mouth. Several on the hard palate, particularly in the anterior half, ranged from 5.0 to 8.0 mm. (fig. 1). On casual inspection, the lesions appeared brown to grayish and slightly raised but, upon gentle rubbing, it was found that the blemishes consisted of tightly packed barbs embedded in the mucosa. Removal of the barbs resulted in profuse bleeding (fig. 1). (The darkened areas on the roof of the mouth consisted of the hemorrhage from erosions; the lesions could not be kept free of blood for a sufficient time for a photographic exposure.) A large ulcerative lesion, 2.5 cm. by 1.0 cm., was observed along the right edge of the hard palate and another, 3.0 by 1.5 cm., was found along the junction of the tongue and the floor of the mouth opposite the left molars (fig. 2). Both figures also illustrate the marked elevations of the rim of the ulceration of three lesions on the dental pad. The lesions were about 7.5 mm. in diameter, eroded in the center, and surrounded by a 2.0- to 3.0-mm. elevated rim. The centers were filled with barbs. Scattered erosions were also found on the dorsum of the tongue anterior to the bulb, on the cheeks posterior to the commissures of the lips, and on the gums at the junction of the incisors. The calf was destroyed on the twelfth day.

The same hay was fed to a horse. After 48 hours of feeding, examination revealed a blanched lesion about 12.0 mm. in diameter on the mucosa of the lower lip opposite the right central incisor. By the seventy-second hour, when the horse was destroyed, the lesion, although not larger in diameter, presented a markedly elevated rim surrounding a dull red crater containing the barbs like those seen in cattle (fig. 3).

Histological sections of the lesions obtained from the destroyed animals presented deep granulating ulcers. The craters contained cell debris surrounded by young granulation tissue infiltrated by eosinophils, neutrophils, and mononuclear leukoytes. Microscopically, the barbs were found embedded in the exudate (fig. 4), as well as in the underlying connective tissue, surrounded by a subacute inflammatory process emphasizing the irritant nature of the foreign bodies. Some degenerating muscle fibers beneath the ulcer were observed.

Molds.—Cultures made of a saline suspension of the hay on selected mediums resulted in isolation of four distinct types of molds. Heavy suspensions prepared from cultures suspended in 5 ml. of sterile saline were transferred to 250-ml. bottles and shaken thoroughly to form a homogeneous suspension. The fifth inoculum consisted of a 5-ml. suspension prepared from 1 Gm. of mycelia and spores which were mechanically removed from the incriminated hay. All five samples were inoculated into cattle.

Each suspension was inoculated intradermalingually into 2 cows and each inoculum was rubbed into a scarified area on the dental pad by the technique usually employed in inoculating vesicular diseases. The animals were carefully examined daily



Fig. 3—Erosion in lower lip of a horse fed the hay for three days.



Fig. 4—Histopathological section of lesion produced in the horse showing the marked inflammatory reaction to the berb in the tissues.

for lesions and fever during a ten-day period and irregularly thereafter for one month with no evidence of a local or systemic reaction.

To further rule out the possibility of molds or fungi causing such a condition, the incriminated hay was placed in porous gunny sacks and the latter evenly interspersed in a stack of good-quality hay prepared from nine bales. The entire hay stack was watered frequently and a tarpaulin was placed over it to maintain the moisture and to determine whether the mold and fungi would leach through the stack. This process was continued for 12 weeks before the hay was fed to calves. Five young calves, 6 months of age, were fed this hay for 30 days with no deleterious effect.

SUMMARY

A stomatitis which was indistinguishable from that observed in the field was reproduced in a calf and a horse fed hay obtained from the affected premises. Demonstration of the barbs of Setaria lutescens in the lesions and failure to produce the disease with molds cultured from the incriminated hay established the causative agent for the condition.

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[The above is a thorough study of a condition which was not uncommon in the days of farm horses, when they were forced to eat the foxtail-like grasses or hay.

Cattle, with their tougher oral membranes, seem more resistant. The dark lesions, bristling with a mass of barbs, were most frequently seen in drought years.—W.A.A.]

Carcinoma of both tonsils, with metastases in the lungs, spleen, myocardium, and kidneys, occurred in a dog 8 years old. —Vet, Bull., June, 1956.

Electric Fan Boosts Gains in Cattle

The weight gain of feeding steers was increased about 1 lb. a day, in the hot Imperial Valley of California, by the use of a cooling electric fan. The fan created a breeze of 3.7 miles per hour under a hay-covered shade 10 ft. high. The fan was more effective than other cooling methods tried, including water sprays, air-cooled buildings, cooled roof surfaces, and cooled drinking water.—U.S.D.A. Release, Washington, D. C., June 20, 1956.

Erysipelas and Antibiotic Feeding

Pigs were not protected against infection, at the State College of Washington, when fed either penicillin or terramycin® at the rate of 15 mg. per pound of feed for 14 days, or penicillin at 40 mg. per pound of feed for 25 days, before they were inoculated with Erysipelothrix rhusiopathiae by the skin-scarification method. The symptoms and lesions were similar to those in untreated pigs but the rate of gain of the antibiotic-fed pigs was slightly faster.—

J. Anim. Sci., Nov., 1955.

The PPLO in Veterinary Pathology

The pleuropneumonia-like organisms (PPLO) are, and should be, the object of extensive research. They were first cultivated from cattle with contagious pleuropneumonia by Nocard in 1898. Since then, they have often been found as saprophytes and have been recovered from at least seven species of animals.

The speaker agrees with others that the PPLO could be "L" forms of bacteria which are fixed and adapted for a variable period to a living organism. Since these fixed L forms can be obtained by cultivating the organism in the presence of antibiotics, it is suggested that the prevalence of PPLO in domestic animals could result from the promiscuous use of antibiotics.—Guy Cousineau, D.V.M., Quebec.

Botulism in Horses

Of 115 horses on a farm in Yugoslavia, 45 showed signs of severe intoxication, and 29 died. Clostridium botulinum toxin, type D, was demonstrated in samples of silage being fed, and the organism was isolated from a decomposed carcass of an unidentified small animal found in the silage.—Vet. Bull., June, 1956.

A Test of Two Piperazine Compounds Against Nematodes of Sheep

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PIPERAZINE COMPOUNDS have been found to be effective anthelmintics for a number of nematode parasites. There are only two reports of their use against nematodes of ruminants. Lee¹ reported, in 1955, that piperazine adipate is effective in removing Neoascaris vitulorum from calves when administered in the amount of 0.1 Gm. per pound of body weight. Gordon² found that piperazine hydrate and piperazine diacetate were both effective against Oesophagostomum columbianum and Oesophagostomum venulosum in sheep but were ineffective against Haemonchus and Trichostrongylus.

This paper describes a test carried out to observe the effect of two piperazine compounds on naturally acquired nematode infections of lambs. These drugs were piperazine hexahydrate and glycopiparsol (piperazine glycolylarsanilate).*

MATERIALS AND METHODS

Thirty lambs and their dams, from the flock of grade ewes of Rambouillet origin at the Montana Veterinary Research Laboratory, were placed on an irrigated pasture known to be contaminated with nematode eggs. The pasture consisted of mixed grasses and was irrigated periodically by flooding during the growing season.

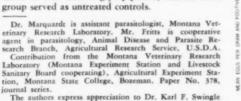
Three groups were formed by placing the oldest lamb in the first group, the next oldest in the second group, and so on down to the youngest lamb, making three groups of 10 lambs comparable in age and weight. Average weights for lambs in the three groups were 66.7 lb., 64.0 lb., and 65.0 lb., respectively. The first group received 10.0 Gm. of glycopiparsol; the second group received 5.5 Gm. of piperazine hexahydrate, an amount equimolar to 10.0 Gm. of glycopiparsol; and the third group served as untreated controls.

Little information was available on which to base the dose of each drug, except that the toxicity of piperazine hexahydrate was known to be low. It was not known whether the other compound had been tested previously as an anthelmintic. Lee' showed that piperazine adipate, 0.1 Gm. per pound of body weight, was effective against N. vitulorum in calves. Accordingly, 10.0 Gm. of glycopiparsol was given by mouth to a lamb weighing about 60 lb. in order to observe the effect of the drug on the animal. Observations made for several days after the animal was given the drug gave no indication of drug toxicity. A 10.0-Gm. dose was, therefore, chosen for each animal in the group receiving glycopiparsol. Drugs were weighed and each dose placed in one or more gelatin capsules to be administered by mouth. Treatment was limited to a single dose since a practical anthelmintic for sheep should be effective in a single dose rather than in repeated doses.

Ewes and lambs were brought to the drylot two days before dosing. Feed and water were withheld for one day before and after treatment. After treatment, all the animals were fed alfalfa hay for a week and then returned to pasture. They were observed for signs of toxicity at least three times a day before, and once a day for a week after, being returned to pasture.

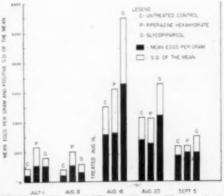
Pretreatment egg counts were made on the lambs July 1 and August 8; then, after treatment counts were made on August 16, 18, and 20, and on September 5.

In making the counts, eggs were classified as one of four types: Nematodirus, trichostrongyles,



The authors express appreciation to Dr. Karl F. Swingle for arsenic analysis of tissues; to Dr. Stuart Young for postmortem examination for pathology of experimental lambs; and to Dr. L. DS. Smith for running toxin tests in mice.

These drugs were supplied through the courtesy of Dr. S. F. Scheidy, Sharp and Dohme Division, Merck and Co., Inc., Philadelphia, Pa.



Graph I—Mean fecal egg counts and standard deviations of the mean of treated and untreated groups of lambs. Strongyloides, and Trichuris. Originally it was planned to destroy 2 animals from each group and count the worms in each lamb. However, in view of the results obtained, this did not seem advisable.

RESULTS

Mean total eggs per gram of feces and the standard deviation of the mean for each of the three groups are indicated (graph 1). The mean is indicated by the height of the solid bar and the positive standard deviation of the mean by the empty bar extending above.

Before treatment, the total eggs per gram for the three groups remained fairly close together. Two days after treatment, the number of eggs per gram in the feces of the lambs receiving glycopiparsol was twice that of either of the other groups, but 18 days later, on September 5, the count had returned to the level of the piperazine hexahydrate and control groups. It appeared that glycopiparsol had a temporary, stimulating effect on egg production. However, for two reasons we believe that this increase in egg production was only an apparent increase. First, the standard deviation was such that the groups overlapped one another to a great extent, and, second, the glycopiparsol may have thrown the lambs off feed for several days, with the reduced fecal output resulting in an increase in the per gram egg count.

The differential egg counts (table 1) reflected much the same pattern as the total egg counts. The predominant type of egg was the trichostrongyle, and it influenced the total egg count more than any other type. The counts generally rose after treatment and then fell during the next two weeks. No one type of egg was reduced in number after treatment when compared with the control group. The number of

Nematodirus eggs fell to 0 per gram on September 5 in the fecal samples taken from the glycopiparsol group. This sample represented 7 animals, but on this test 6 of the 10 lambs from the untreated control group also were negative for Nematodirus ova. Therefore, this was probably a sampling error coupled with the dilution factor by which each egg counted under the microscope represented 125 per gram of feces.

Three lambs which died five to seven days after treatment were found to have internal parasite count averages of: Haemonchus, 328; Nematodirus, 1,264; Trichostrongylus, 84; and Trichuris, 19. Several Dictyocaulus filaria were found in the trachea of 1 lamb. These counts are similar to those made about six weeks previously on 2 lambs, with no indication that any worms were removed by the treatment.

Although the lambs were observed closely, no signs of drug toxicity were seen; however, 1 was found dead on the fifth morning after treatment and a second died an hour later. Both had been treated with glycopiparsol and showed nearly the same gross pathological changes. Their livers were fatty, cirrhotic, and had some infarcts; the kidneys were congested; there was excess peritoneal, thoracic, and pericardial fluid; also hemorrhages of the heart, and the intestinal tract was hemorrhagic and hyperemic. Seven days after treatment, the third lamb was found unable to rise and died a few hours later. Necropsy revealed no specific lesions. Mice, inoculated with centrifuged intestinal contents from each of the lambs, survived, so death evidently was not due to enterotoxe-

Livers from the 2 lambs which died five days after treatment contained 233 and 111 μg . of arsenic (expressed as As_2O_3/Gm .),

TABLE 1-Differential Egg Counts Before and After Treatment with Piperazine Compounds

		Average number of eggs/gram						
Date	Treatment	Trichostrongylus	Nematodirus	Strongyloides	Trichuris	Total		
August 8	Piperazine-6HrO	276	108	158	3	545		
	Glycopiparsol	132	58	146	4	340		
	Untreated control	85	87	60	2	234		
August 16	Drugs administered	d						
August 18	Piperazine-6H _f O	1,455	83	2	101	1,641		
	Glycopiparsol	2,723	320	310	209	3,282		
	Untreated control	1,396	107	4	72	1,579		
August 20	Piperazine-6H ₂ O	829	98	164	70	1,283		
	Glycopiparsol	1,690	307	217	14	2,228		
	Untreated control	841	201	213	150	1,405		
September 5	Piperazine-6H ₂ O	795	69	30	83	977		
	Glycopiparsol	861	0	90	18	969		
	Untreated control	766	50	25	50	891		

respectively. The organs of the lamb which died seven days after treatment contained arsenic, expressed as μg . $As_2 0_3/Gm$., as follows: liver, 19; kidney, 12; small intestine, 16; heart, 3; and brain, 1. These analyses did not indicate in what form the arsenic was present but, if it were entirely $As_2 0_3$, the amount found in the livers of the first 2 lambs was nearly a hundred lethal doses. However, this concentration of $As_2 0_3$ was unlikely since all 10 animals did not die.

DISCUSSION

The results of this experiment indicate that the compounds glycopiparsol and piperazine hexahydrate are not effective against trichostrongyles, Nematodirus, Strongyloides, or Trichuris in sheep. This agrees with Gordon² who reported that piperazine was effective only against Oesophagostomum in sheep, and that doses up to 25 Gm. of piperazine hydrate introduced into the rumen of sheep were ineffective against Trichostrongylus. Since Oesophagostomum is seldem found in our sheep, the efficacy of piperazines against it could not be evaluated in this test.

Glycopiparsol is toxic when administered by mouth to sheep and apparently has no effect on the common nematodes of sheep. Further testing of the compound does not seem warranted.

SUMMARY

1) Two piperazine compounds, piperazine hexahydrate and glycopiparsol (piperazine glycolylarsanilate), were found to be ineffective against trichostrongyles, Nematodirus, Strongyloides, and Trichuris of sheep.

Glycopiparsol is too toxic to be considered for further testing as an anthelmintic in sheep.

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Mice infected with Brucella abortus, especially strain 19, were more resistant to tubercle bacilli than control mice. This may be due to inhibition by the phagocytes which had resulted from the Brucella infection.—Am. Rev. Tuberc., Feb., 1956.

Anaplasmosis in Sheep and Goats

An Anaplasma organism recovered from a flock of sheep in Kansas was identical with Anaplasma ovis, previously unreported in the United States. Individuals of the flock had originated from the states of Colorado, Wyoming, and Montana. The organism was readily transmitted to sheep and goats but not to 12 splenectomized calves which remained fully susceptible to infection with Anaplasma marginale.

Experimental infection of sheep and goats with A. ovis was usually mild or subclinical, with goats more susceptible than sheep. Erythrocyte counts were reduced an average of 8.5 million cells per cubic millimeter in 11 goats; an average of 4.3 million cells per cubic millimeter in 14 sheep. Body temperatures, usually unchanged, sometimes were 105.8 F. at the peak of Anaplasma infection. Animals with the greatest drop in blood values showed marked evidence of anemia. The appetite was not noticeably affected. Splenectomy considerably increased the susceptibility of both sheep and goats to experimental infection.

The distribution of A. ovis in the United States is undetermined but, considering the origin of these sheep, it seems probable that the disease occurs in the Rocky Mountain area.

Although the organism usually produces subclinical infection, the literature indicates that acute, sporadic infection may occur. Conditions of heavy parasitism, malnutrition, debilitating diseases, and increased individual susceptibility may predispose to acute infection. The possibility of anaplasmosis, therefore, should be considered in cases of acute anemia occurring in sheep or goats in this country. Diagnosis may be confirmed by blood smear examination for Anaplasma bodies, and by the anaplasmosis complement-fixation test. -[E. J. Splitter, H. D. Anthony, and M. J. Twiehaus: Anaplasma Ovis in the United States. Experimental Studies with Sheep and Goats. Am. J. Vet. Res., 17, (July, 1956): 487-491.]

Anthrax Spores in Imported Bones.—
In 41 cargoes of bones imported into Britain, anthrax spores were demonstrated in five by animal inoculation. Cultural methods were found unsuitable for such studies.—Vet. Bull., March, 1956.

The Critical Evaluation of a New Swine Anthelmintic Containing Piperazine and Carbon Disulfide—Parvex

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Kalamazoo, Michigan, and State College, Mississippi

ON THE BASIS of governmental forecast based on population trends, if the present rate of pork consumption is to be maintained in the United States, it will be necessary to increase pork production by 176 million lb., or 1.5 million 200-lb. hogs, each successive year. To do so, better methods, better nutrition and, above all, better control of disease will be necessary.

Although not responsible for an appreciable death rate among hogs, internal parasites, particularly the ascarid and nodular worms, account for an enormous loss through unthriftiness and inefficient feed conversion.¹⁻³

A new group of chemicals, the piperazine compounds, is under investigation as anthelmintics. They are not new in medicine, as they were used in the 1890's for the treatment of rheumatism, gout, and urinary lithiasis. Recently, evidence has been accumulating, particularly in British literature, which shows that certain piperazine salts, i.e., hexahydrate, 4.5 hydrate, 6 citrate, 7 and adipate, 8 are useful for treating enterobiasis (pinworms) and ascariasis in man. Piperazines have also shown promise for the control of filariasis in man, 9 rats, and cats, 10 trichinosis in mice, 11 and ascariasis in poultry, 12,13

The chemistry of another piperazine, betaine of 1-piperazine carbodithioic acid (piperazine-carbon disulfide complex), a grayish white powder relatively insoluble and stable at neutral pH, is interesting in that it readily dissociates in weak acids, such as gastric juice, to produce two anthelmintic substances, piperazine and carbon disulfide.14 Since carbon disulfide is recommended for the elimination of large intestinal roundworms and bots of the horse, and the red and thick stomach worms of swine,15,16 it is believed that the dissociation products, piperazine and carbon disulfide, may exert a dual action against intestinal parasites.

The piperazine-carbon disulfide complex

was reported¹⁴ to possess all of the essential requirements for an ideal anthelmintic: *i.e.*, low toxicity for the host, specific toxicity for ascarids and nodular worms, and suitability for mixing with swine rations. The compound is available as parvex, 8° a 22 per cent concentration in an inert vehicle. The increase in volume is designed to facilitate the complete and thorough mixture of the anthelmintic with swine feed.

In the clinical investigation of the anthelmintic properties of the piperazine-carbon disulfide complex, a series of critical trials were conducted in swine with the pure compound and with the 22 per cent mixture.

METHODS

The swine used in these studies were selected because they harbored naturally acquired ascarid infections. Data on the anthelmintic efficiency with respect to other nematodes harbored were also recorded. Weight records of each animal were taken before treatment to determine the proper dose and some animals were again weighed before necropsy. The animals, individually confined, were given free access to water but food was withdrawn the evening before treatment. The drug was administered as a single feeding in about 0.5 lb. of the regular ration per animal. Counts of parasite eggs and the numbers of parasites expelled and necropsy examinations were made on each pig.

Where the numbers of parasite ova shed by the pigs were used as criteria, the counts were made by the Stoll procedure, taken at varying intervals before treatment and again just before the animal was slaughtered for necropsy.

The ascarid egg fertility was determined by the procedure of Riedel and Fletcher" from ova recovered from feces passed by the hosts when worms were expelled and from cultures prepared from eggs collected from gravid female worms expelled by the hosts.

The numbers of worms passed and those still harbored at necropsy were used to determine the anthelmintic efficiency of the drugs.

RESULTS AND DISCUSSION

Critical Trials with the Pure Compound.

—The data (table 1) show the anthelmintic

Research parasitologist, Department of Animal Diseases, Mississippi Experiment Station, State College (Riedel); and Department of Pharmacology, Research Laboratories, Upjohn Co., Kalamazoo, Mich. (Larson).

^{*}Trademark, the Upjohn Co. brand of piperazinecarbon disulfide complex (betaine of 1-piperazine carbodithioic acid), incorporated in an inert carrier.

TABLE I-Swine Treated with 110 mg, per Kilogram of Body Weight of Piperazine-Carbon Disulfide Complex

			Asc	carids		Ascarid ovum	countr
	Dose (Gm.)	Expelled	Recovered at necropsy	Efficiency (%)		days post- treatment	
1	82.0	4.0	1	0	100	500/0/04	0
21	84.5	4.25	206	11	95	1,100/9/3,000	0
31,1	100.0	5.0	0	0	100	700/200/9	0
41	90.0	4.5	34	1	97	400/3,900/1,100	0
5	85.0	0 (control)	0	42	Queent 0	200//	1,400
61	82.5	0 (control)	0	0	20000	0/0/0	0

Pigs 2, 3, and 4 passed Oesophagostomum ova before treatment but no parasites were found in feces or at

Pretreatment egg count indicated infection but no worms recovered before or at necropsy. They may have been eaten.

Pig 6 passed Oesophagostomum ova throughout the trial, but the parasites were not found at necropsy. Series of three ovum counts.

results of pure betaine of 1-piperazine carbodithioic acid administered at the rate of 110 mg, per kilogram of body weight for the control of Ascaris in swine.

The 4 treated pigs expelled from 95 to 100 per cent of their ascarids, both immature and adult forms, mostly within 24 hours following treatment, although a couple were found after 48 hours. The ovum counts made on fecal samples became negative within four days. One of the control animals was not infected with ascarids, but the others did not expel parasites and their ascarid egg counts increased during the period of observation. One control and 3 treated pigs were infected with Oesophagostomum dentatum. Although the egg counts of this parasite were reduced following treatment, no parasites were recovered in the feces or in the intestinal tract at necropsy.

Data on pigs managed under the same conditions, except that the dosage was raised to 125 mg. per kilogram, are shown (table 2). The 6 treated animals expelled all of the ascarids harbored; the 2 nontreated animals passed none. The ovum

counts of the treated pigs became negative during the four-day post-treatment period. The reduction of ovum fertility among the treated pigs was not significant. A comparison of the weight gains of the treated and nontreated animals indicated that the drug did not retard host growth.

The animals readily ate the medicated feed, with no subsequent loss of appetite. Expulsion of worms was initiated within 24 hours and nearly all were passed within 36 hours after treatment.

Necropsy examination revealed only the scars of ascarid migrations in the livers.

Critical Trials with the 22 Per Cent Mixture.-Data on pigs treated with a 22 per cent mixture (parvex) of the piperazinecarbon disulfide compound in an inert carrier are shown (table 3). The level of dosage was 125 mg, of active ingredient per kilogram of body weight.

The data show that the mixture was completely effective for the elimination of both immature and mature ascarids among the treated pigs. None of the control animals eliminated worms before necropsy. The feces of all the pigs except those from 1

TABLE 2-Swine Treated with 125 mg. per Kilogram of Body Weight of Piperaxine-Carbon Di-

					sumde C	ombiex				
		Weight (lb.)		Ascarids		-	Ascarid ovum counts		Ovum fertility (%)	
Hog (No.)	Dose tr	Pre- reatment (Mon.)	Post- treatment (Fri.)	Ex- pelled	Recovered at necropsy	Effi- ciency (%)	Pre- treat- ment	Post- treat- ment	From feces	From expelled
1	9.6	168	179	26	0	100	99	0	69.1	57.5
21.3	11.7	205	210	0	0	100	10	0		*****
32	11.5	210	202	1	0	100	0	0	No females harbored	No females harbored
4	7.8	137	142	6	0	100	495	0	90.0	50.7
51	11.0	192	201	8	0	100	99	0	78.0	63.2
6	7.8	138	143	3	0	100	33	0	72.7	Females immature
7	0 (control) 198	201	0	1	0	169	brente	0.0 == 0.00	31.4
8	0 (control) 193	197	0	10	******	1,345	*****	80×000	26.6

Harbored 2 and 6 Macracanthorhynchus sp., respectively, at necropsy, none was passed. Became ill on fourth day after treatment but symptoms were not referable to drug.

Pretreatment egg count indicated infection but no worms were recovered before or at necropsy. They were probably eaten.

TABLE 3—Swine Treated with 565 mg. per Kilogram of Body Weight of a 22 Per Cent Mixture (Parvex), or 125 mg. per Kilogram of Active Ingredient, Piperezine-Carbon Disulfide Complex

			Asca	rids			
			_	Recovered		Ascarid ovum counts	
Hog (No.)	Weight (lb.)	Dose (Gm.)	Expelled	at necropsy	Efficiency (%)	Pretreatment	4 days Post treatment
1	55	14.13	53	0	100	2,700	0
2	53	13.56	56	0	100	2,200	0
3	44	0 (control)	0	13	0+++00	100	200
4	55	0 (control)	0	1	******	0	0
5	57	14.69	38	0	100	5,500	300
6	46	11.89	17	0	100	4,100	0
7	60	15.54	35	0	100	7,200	0
8	57	14.69	40	0	100	7,200	300

treated and the 2 control animals became free from ascarid ova within four days.

The animals ate the medicated feed without hesitancy and were returned to their regular ration about four hours afterwards. No loss of appetite, abnormal behavior, or indication of toxicity were observed. The ascarids, still alive, were passed within 28 hours after treatment.

Since swine may be coprophagous and may consume expelled ascarids, it is possible that in all three trials greater numbers of these parasites may have been passed and consumed.

Variations in the ovum counts may be attributed to the cyclic nature of ovum expulsion by the female ascarid and by the random sampling of the feces.

There was good indication that the piperazine-carbon disulfide complex was active against the swine nodular worm, Oe. dentatum, in the first trial, but it did not eliminate the macracanthorhynchids from 2 infected pigs in the second trial.

SUMMARY AND CONCLUSIONS

The anthelmintic properties of the betaine of 1-piperazine carbodithioic acid (piperazine-carbon disulfide complex) as a pure compound and as a 22 per cent concentration in an inert carrier (parvex) were investigated for the control of roundworms in swine.

A series of three critical tests were conducted, involving 22 swine with natural infections of Ascaris lumbricoides var. suis. In each trial, the feed was withdrawn from the pigs the evening prior to treatment. The compound was administered individually by mixing the dose in about 0.5 lb. of the regular ration. The medicated feed was readily consumed by all experimental animals.

In the first trial, the compound was given at a level of 110 mg. per kilogram of body weight and was 95 to 100 per cent effective in eliminating A. lumbricoides var. suis. In the second trial, the compound, given at 125 mg. per kilogram, was 100 per cent effective. In the third trial, the compound, given at the 125 mg. per kilogram level, mixed in an inert carrier, was 100 per cent effective against A. lumbricoides var, suis.

The number of ascarid ova shed by the host decreased in inverse proportion to the number of worms eliminated. Ascarid ovum fertility was not significantly affected by treatment.

There was strong indication of activity against the nodular worm, *Oesophagostomum dentatum*, but no apparent effect on macracanthorhynchids, the "thorny-headed worms."

The piperazine-carbon disulfide complex given to the pigs in these trials caused no loss of appetite, loss of weight, or any other untoward reactions.

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The Use of Piperazine Adipate in Ascariasis of Captive Zebras

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The advent of piperazine adipate as a vermifuge in ascarid infections has been an important addition to the armamentarium of the equine practitioner. Concomitantly, it has resolved a perplexing problem for the zoo veterinarian, the treatment of ascariasis in zebras.

Many captive zebras in this country show varying degrees of ascarid infection on

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routine stool examination. The previously accepted equine vermifuge of choice, carbon disulfide, was unsatisfactory for zebras as it had to be administered by stomach tube or thick gelatin capsule. Neither of these procedures was considered practical for use on zebras because of the animals' intractability.

On the other hand, piperazine adipate in powder form can be mixed with the zebras' grain and the medicated feed is readily consumed.

Procedure.—All hay and grain is withheld for 24 hours previous to dosing. This assures consumption of all the medicated grain and provides optimum conditions under which the vermifuge may act. The piperazine powder is then thoroughly mixed with half the normal ration of oats (dampened to make the powder adhere) and offered at the regular feeding time.

Dosage.—Our initial dosage schedule was 220 mg. of piperazine adipate powder per kilogram of body weight.² Using estimated body weights, we were successful in reducing ova counts to zero that had ranged from ± to+++.*

Because of the possible inaccuracy of estimated weights, the last group of zebras was dosed according to the schedule¹ of 3 oz. of the powder for mature and $1\frac{1}{2}$ oz. for immature zebras (weights of mature

*Sugar-flotation technique: 10 Gm. of feces is thoroughly mixed with 120 cc. of water, strained, centrifuged in two tubes at 1,400 r.p.m. for five minutes, the supernatant poured off, and the residue combined in one tube. This tube is filled with saturated sugar solution, thoroughly mixed, a coverslip is placed over the top, and the tube is centrifuged at 1,400 r.p.m. for five minutes. The coverslip is then placed on a slide and examined under low power. The following designations are used to report results: \(\precept{\pi}\), occasional ova; \(\phi\), one to five ova per field; \(\phi\)+\(\phi\), five to ten ova per field; \(\phi\)+\(\phi\), ten to 15 ova per field; and \(\phi\)+\(\phi\)+\(\phi\). ten to 15 ova per field; and

ical Society, New York City. ++++, 15 to 20 ova per field.

TABLE I—Effects of Using Piperazine Adipate in the Treatment of Ascariasis in Captive Zebras

Zebra	Pretreatment ova count	Piperazine adipate dosage (Gm.)	Ova count 1 to 2 wk. post-treatment	Re-treatment dotage (Gm.)	Ova count 1 to 2 wk. post- treatment
Mature d Chapman	++	60	Negative	****	****
Mature ? Grevy	+	70	Negative	****	
Mature & Grant	+	60	Negative		
Mature 9 Grant	++	60	Negative	6==0	*****
6-month-old & hybrid	*	25	*	45	Negative
Mature & Grant	++	60	±	60	Negative
Mature & Grant	*	90	Negative	****	9005
Mature 9 Grant	+	90	Negative		-
7-month-old & Grant	++++	45	Negative	****	
Mature 9 Grant	+	90	Negative	****	-
Mature & Chapman	±	90	Negative	****	-
Mature ? Chapman	±	90	Negative	****	-
Marure 9 Chapman	++++	90	Negative		*****

zebras range from 450 to 750 lb., depending upon their species). The results were satisfactory (table 1), with no evidence of toxicity.

All the zebras treated voided large numbers of ascarids in stools 36 to 72 hours following treatment.

SUMMARY

Piperazine adipate powder was successful as an anthelmintic when administered in the feed to 13 zebras affected with ascariasis. The dosage and medication procedures are described.

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Piperazine citrate led to the evacuation of 95 per cent of ascarids in chickens when given in drinking water (4,000 mg./gal.), and its continuous use (1,000 mg./gal.) prevented infection. The drug was also effective against ascaris in swine and dogs.—Vet. Bull., June, 1956.

Avoid Losses from Lightning

Pasture fences made of wire on wood posts should be grounded every 165 ft. with No. 10 or heavier wire, extending at least the full depth of the post, and stapled to each intersecting wire. Trees, under which animals often gather, should have lightning rods at the top and be grounded to the depth of moisture, usually 6 ft. Buildings with metal roofs should be grounded at two opposite corners with No. 6 or heavier copper wire.—Progressive Farmer, July, 1956.

[In April, 1948, 2 healthy, nursing sows were found dead, in five days, each lying outside, but against a corner, of a large all-metal shed on a concrete foundation. Necropsy on 1 was negative. Electrocution was suspected but there had been no lightning. However, inspection of the electric wires leading to the building revealed that the insulation had been worn off the wire where it rubbed against the edge of the roof. The spot where the sows lay, just outside the shed door, served as their urinal

and was usually wet. The sows, standing on this wet ground and in contact with the metal shed while urinating, probably had been electrocuted when the wire was blown against the roof.—W.A.A.]

Biological Effects of Radiation

Atomic weapon testing has not raised world-wide radiation to levels significantly greater than natural radioactivity plus dental and medical use of x rays. However, since all radiation is harmful, records should be kept of every individual's known exposures. Individuals should not receive more than 10 roentgens as a total accumulated dose from conception to age 30.

Radiation increases the rate of aging and, thus, shortens life. Contamination of the food supply from fallout is negligible but the maximum tolerable level is not known. Among the fields for which accelerated research is recommended are: genetics, radiation pathology, and the concentration of radioactive material by plants and animals.—Science, June 22, 1956.

Zoxazolamine, New Muscle Relaxant

In the search for an agent to relieve spasticity, zoxazolamine which, although chemically unrelated, has activity similar to mephenesan, was the most promising. It produced a flaccid paralysis of the musculature without depressing consciousness or respiration. However, it produced weakness of the involved muscles and impaired ability to move. It has the advantages of being given orally, of long duration, and of minimum side-effects. When combined with chlorpromazine, its muscle-relaxing effects are greatly intensified.—J.Am.M.A., March 3, 1956.

Newcastle Disease Virus in Man

While working with Newcastle disease virus, a technician was twice infected in the same eye at an interval of ten months. Each time, there was a sudden conjunctivitis, headache, and malaise. The virus was recovered both times. Its pathogenicity for hens was unchanged. The hemagglutination-inhibition test was negative the first time, positive the second; neutralizing antibodies were also detected.—State Vet. M. Inst., Stockholm, Sweden, 1954.

Canine Helminthiasis Complicated with Balantidium Species

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Within recent years, the dog has been reported as a host for Balantidium sp. In 1949, shortly after the initial account of a new host for the ciliate, a second report describing a clinical case appeared in the veterinary literature. Since then, 7 additional balantidial dysentery cases in canine patients have been recorded. This report is being presented as additional information on this intestinal protozoa and its possible significance for small animals.

HISTORY

A male Pointer, 6 years old, was brought to the clinic with a history of having persistent, bloodstained diarrhea with complete anorexia for two days. A mild degree of dehydration was evident.

Microscopic examination of the feces* revealed a heavy infection of Ancylostoma sp. and *Trichuris vulpis*. The trophozoite stage of Balantidium sp. was also present in considerable numbers. The diarrhea continued and the fecal findings were the same for the next three days. Although the animal ate sparingly, his vitality declined steadily.

TREATMENT

Specific therapy for canine balantidiasis is available^{2,3,5-7}; however, the removal of the nematode parasites was given priority in treatment.

After the patient was fasted for 12 hours, n-butyl chloride (3 cc./5 lb. of body weight) was administered for the hookworm infection, with a possibility that it would also be effective against the whipworms. Six hours after the initial therapy, the patient consumed a full ration and, 12 hours later, whipcide† was given as specific treatment for T. vulpis. Fluids (5% dextrose and physiological saline solutions) were also administered as indicated. Forty-eight hours after the latter treat-

ment, a marked improvement was apparent and parenteral therapy was discontinued.

Seven days after the first treatment for the nematode infections, all evidence of illness had disappeared. The patient had gained remarkably in physical condition, and no evidence of helminth or protozoan parasitism was found during the last three days. The animal was released 15 days after admittance to the clinic and, from all indications, has fully recovered.

The patient suffered from a combined infection of hookworms and whipworms complicated with an intestinal ciliate pathogenic for dogs.

The protozoan infection apparently subsided after the helminths were eliminated.

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Boy Infected with Canine Whipworm

A boy, 4 years old, whose only animal contact had been 3 dogs, was ill and nervous. Of 16 stool specimens examined over a six-month period, all contained large Trichuris eggs, and 1 adult female Trichuris was recovered. Fecal specimens from the dogs yielded numerous Trichuris vulpis ova.—J. Parasitol., April, 1956.

From the Department of Pathology ond Parasitology, School of Veterinary Medicine, University of Georgia,

^{*}Both saline smear and fecal flotation methods are employed routinely for diagnosing intestinal parasitism in small animals.

[†]Pitman-Moore Co., Indianapolis, Ind.

The Effect of High Levels of Aureomycin (Chlortetracycline) in the Ration on Development of Immunity Following Vaccination Against Hog Cholera

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THE GROWTH-PROMOTING effect of antibiotics, when added to the feed of animals, has been well established by experimental studies since 1950. Aureomycin® (chlortetracycline) in swine rations also has considerable value where enteric disturbances are occurring or have occurred on the farm. Such enteric problems frequently appear in swine following hog cholera vaccination.

This experiment was designed to provide more definite information on the value of chlortetracycline in the ration of hogs before and after vaccination against hog cholera.

REVIEW OF LITERATURE

The value of dried whole cultures and fermentation residues containing chlortetracycline and vitamin B₁₂ in swine rations was first investigated and reported in 1950 at the Florida Agricultural Experiment Station¹. The use of these residues in swine rations was accompanied by a reduction in enteric problems and a marked growth increase over that of control groups.

The use of chlortetracycline at a level of 1.25 Gm./100 lb. of ration for baby pigs was found to be associated with a reduced mortality, fewer unthrifty baby pigs, and rapid early growth.

Research workers at Purdue, using chlortetracycline and streptomycin singly or in combination, reported a decrease in the severity of, and the number of deaths from, swine dysentery.

Since many of the rations used for experimental pigs were found to be deficient in vitamin B₁₃, any growth response obtained by the chlortetracy-cline-fermentation product was believed due both to the vitamin B₂₃ and the antibiotic present.

The use of crystalline chlortetracycline, streptomycin, procaine penicillin G plus vitamin B₁₂, sulfathalidine, and a chlortetracycline-vitamin B₁₂, fermentation feeding supplement in extremely unthrifty pigs was studied at the Oklahoma Agricultural Experiment Station.⁵ After the addition of antibiotics to the feed, when eaten regularly, vigor and coat improved, the enteritis disappeared, and the weight gains were greater than in the control groups.

control groups.

From the Department of Veterinary Science, Ohio Agri-

cultural Experiment Station, Wooster.

This study was supported, in part, by a grant from American Cyanamid Co., New York City, N. Y. Acknowledgement is made to Lederle Laboratories for supplies of rovac@ and to Mr. A. C. Dornbush for the chlortetracycline assays.

MATERIALS AND METHODS

This experiment was conducted during the fall and winter of 1955-1956. Aurofac-10,* containing 10 Gm. of chlortetracycline per pound, was used as a source of antibiotic. On the first day of the experiment (day 1), 50 cholera-susceptible pigs of mixed breeding, 6 to 12 weeks old, were assembled in five groups of 10 each, with the total weights of the groups essentially equal, and blood samples were collected for determination of levels of chlortetracycline. During the experiment, each group was fed a 15 per cent protein basal ration consisting of 1,240 lb. of corn, 300 lb. of oats, 170 lb. of soybean oil meal, 136 lb. of meat scraps, 100 lb. of ground alfalfa hay, 32 lb. of minerals (including trace minerals), 20 lb. of irradiated yeast, and 2 lb. of forta-feed® 2-49C* per ton.

Throughout the experiment, groups 1 and 2 were given only the basal ration and groups 3, 4, and 5, starting on day 1, were given aurofac-10 at the rate of 10, 20, and 40 lb. per ton of feed respectively (table 1). This represents a chlortetracycline concentration of 100 Gm. per ton (50 mg./lb.) for group 3; 200 Gm. per ton (100 mg./lb.) for group 4; and 400 Gm. per ton (200 mg./lb.) for group 5. Daily rectal temperatures were taken starting on day 3 and all pigs were weighed and blood samples were taken on day 17 for chlortetracycline assay.

On day 18, groups 2, 3, 4, and 5 were given 2 cc. of rovac, after which the appetite and vigor of the pigs were observed daily and leukocyte counts were made on selected pigs at irregular intervals. On day 44, all pigs were weighed, blood samples were taken for chlortetracycline assay, and the feeding of aurofac-10 was discontinued. The groups were again weighed on day 65 and were challenged on day 68 with 4 cc. of hog cholera virus.

After challenge, all groups were observed daily for anorexia and signs of hog cholera and the temperature of each pig was recorded. Necropsies and bacteriological studies were made on all pigs which died after challenge. The brains were removed and fixed in 10 per cent neutral formalin. Tissue blocks were cut from the cerebellum of 8 pigs, the medulla of 7, hypothalamus of 7, and cerebral hemisphere, including the wall of the ventricle, of 5. These were embedded in paraffin, sectioned at 6 μ , and stained with hematoxylin-eosin.

^{*}Fine Chemicals Division, American Cyanamid Co., New York City, N. Y.

On day 85, all remaining pigs were weighed and the experiment was terminated.

RESULTS

All the groups given rovac withstood the challenge with virulent hog cholera virus at 50 days after vaccination whether or not chlortetracycline was added to the feed. All unvaccinated control pigs (group 1) died except 1 which was resistant to the virus.

The microbiological assay for chlortetracycline in the feed revealed levels above the theoretical amounts which were added (table 2).

Although the average concentration of chlortetracycline in the blood serum of each group (table 3) showed some variation in the same groups on day 17 compared with day 44, groups 3 to 5 contained amounts which reflected the different quantities of aurofac-10 used in the rations.

In the early part of the experiment, a number of high temperatures (105 to 106 F.) were recorded (fig. 1). Leptospirosis was suspected but selected pigs were nega-

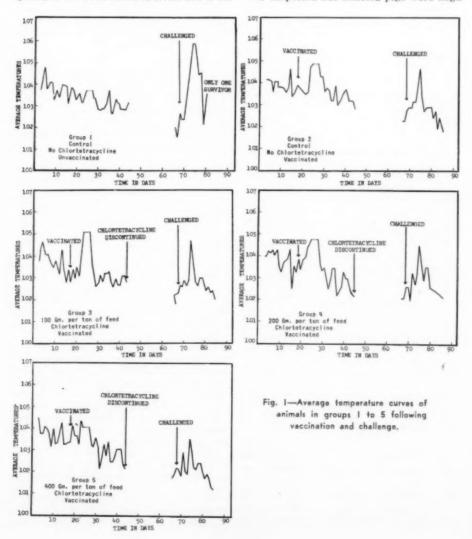


TABLE I-Schedule of Treatment of Swine

Group	Antibiotic in feed from day 1 to day 44	Vaccination on day 18 ⁴	
1	Control—no chlortetracycline added	No	
2	Control—no chlortetracycline added	2 cc. rovac	
3	100 Gm./ton or 50 mg. chlortetracycline/lb. feed	2 cc. rovac	
4	200 Gm./ton or 100 mg. chlortetracycline/lb. feed	2 cc. rovac	
5	400 Gm./ton or 200 mg. chloretracycline/lb. feed	2 cc. rovac	

*All animals were challenged with virulent hog cholera virus on day 68.

tive to the agglutination-lysis test. The pigs otherwise appeared clinically healthy, were active, and had good appetites. The apparent febrile response was attributed to excitement.

Following vaccination with rovac, a febrile reaction occurred in groups 2, 3, 4, and 5. However, the febrile period in groups 3 and 5 was of shorter duration than that of group 2, and the maximum temperatures recorded in group 5 were noticeably lower than those in control group 2.

When challenged, there was no difference in the duration of febrile response in groups 2 to 5 but the maximum temperatures were somewhat less in group 5 than in groups 2, 3, and 4 which received less chlortetracycline.

Following vaccination and subsequent challenge with hog cholera virus (fig. 2), the animals in group 1 at day 65 had gained an average of 13 lb. more per pig than those in group 2. At the termination of the experiment (day 85), groups 3, 4, and 5 averaged 21 lb., 24 lb., and 37 lb. more per pig than the vaccinated group without chlortetracycline (group 2), and the appetite, vigor, and general appearance of the pigs in groups 3, 4, and 5 were noticeably better than those in group 2.

TABLE 2-Assay of Chlortetracycline in Mixed Feed

Sample from	Fed to	Theoretical amount	Assay
Bag 1	Groups 1 & 2	No chlortetracycline added	0.0 Gm./ton
			111.0 Gm./ton
Bag 2	Group 3	100 Gm./ton	114.8 Gm./ton
			244.0 Gm./ton
Bag 3	Group 4	200 Gm./ton	216.0 Gm./ton
			447.0 Gm./ton
Bag 4	Group 5	400 Gm./ton	414.0 Gm./ton

Leukocyte counts made on selected pigs did not vary appreciably between groups through 5, but in all pigs examined following challenge they decreased from normal ranges to between 6,500 and 9,000 per cubic millimeter of blood. Four days after challenge, pigs in group 1 developed a leukopenia which became more pronounced the next two days, with leukocyte counts of 4,000 to 5,000 per cubic millimeter of blood.

Tissues removed at necropsy from pigs in group 1 were cultured on bovine blood agar and eosin-methylene blue agar plates, and species of Pasteurella, Salmonella, Staphylococcus, and Streptococcus were isolated from the different pigs.

CONTROL PIGS

The gross lesions in the first control pig that died, six days following challenge, showed only diffuse, dark, hemorrhagic gastritis on the greater curvature of the stomach and petechial hemorrhages in the subserosa of the ileum. Fibrinous threads were present in the peritoneal cavity. The

TABLE 3—Average Concentration of Chlortetracycline in the Blood Serum by Groups, in Gamma per

Milliliter				
Groups	Day 1	Day 17	Day 44	
1				
2				
3	0-10	0.122	0.089	
4	****	0.131	0.163	
5		0.51	0.28	

same lesions were present in the 2 pigs which died on the seventh day and, in addition, there were numerous subpleural hemorrhages in the lungs and hemorrhages on the mucosa of the small intestine. One pig had ecchymotic hemorrhages in the bladder mucosa.

Lesions in the 6 pigs which died between the eighth and twelfth days following challenge were characteristic of hog cholera and included petechial and ecchymotic subpleural hemorrhages, petechial hemorrhages on the kidneys, epiglottis, urinary bladder mucosa, hemorrhagic lymph nodes, hemorrhagic gastritis, enteritis and colitis, and some pneumonia.

The tenth pig showed no illness. It was destroyed on the sixteenth day following challenge and was negative for gross le-

Microscopic brain lesions characteristic of hog cholera^{6,7} were found in all 9 of the pigs which died from hog cholera. These findings included perivascular and focal gliosis, petechial hemorrhages, and leptomeningeal infiltration of lymphocytes in some animals. Neuronal degeneration and neuronophagia were found occasionally. The brain from the tenth control pig was negative for microscopic lesions.

DISCUSSION

There was no indication that high levels of chlortetracycline given before and after vaccination against hog cholera with modified live virus interfered with the production of immunity. The results in this experiment further verify the conclusions of others' that chlortetracycline has a beneficial effect on the rate of growth in clinically disease-free pigs. Observations on the vigor, appetite, and febrile response of pigs on high levels of chlortetracycline after vaccination indicate less reaction to the hog cholera virus challenge than was evident in pigs receiving no antibiotic, and also a less severe reaction in group 5 than in groups 3 and 4, indicating a possible

correlation with the level of chlortetracycline fed.

Leukocyte counts were made regularly on only 1 pig in each of the five groups during the experiment but were made on additional animals following challenge. The limited data confirm the observation that a leukopenia follows exposure to hog cholera virus. The feeding of chlortetracycline produced no apparent effect on the development of a leukopenia either after vaccination with rovac or after challenge with hog cholera virus.

The recovery of species of Salmonella, Pasteurella, Streptococcus, and Staphylococcus from the tissues of pigs dying of hog cholera is probably of no great significance. These organisms may be present in normal pigs and may produce disease during the period of leukopenia which follows hog cholera vaccination.

The 3 unvaccinated control pigs which died six and seven days following challenge did not show the typical lesions usually associated with hog cholera. However, micro-

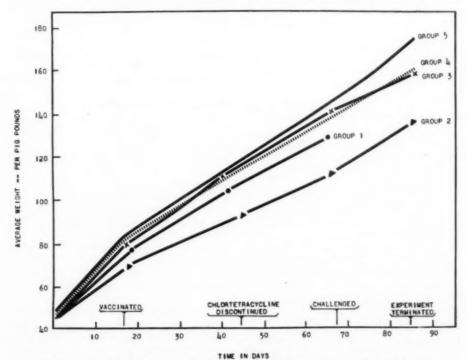


Fig. 2—Average weight gain in pigs following hog cholera vaccination and challenge. Group I—not vaccinated, no chlortetracycline; group 2—vaccinated, no chlortetracycline; Groups, 3, 4, 5—vaccinated, chlortetracycline.

scopic examination of the brains revealed the changes that occur in hog cholera.^{6,7} The other 6 pigs which died later had both the gross and microscopic lesions associated with hog cholera. The tenth control pig survived challenge, presumably a result of natural immunity.

SUMMARY AND CONCLUSIONS

Chlortetracycline was fed to swine at levels of 100, 200, and 400 Gm. per ton of feed 18 days prior to and 26 days after vaccination against hog cholera with a modified live virus. The production of immunity was not affected by the chlortetracycline.

The pigs given chlortetracycline gained more rapidly than the controls, the rate increasing with the level of antibiotic fed.

Vaccinated animals which did not receive the antibiotic gained an average of 13 lb. less than controls which received neither antibiotic nor vaccine.

Animals fed the highest level of chlortetracycline displayed less change in temperature or appetite when vaccinated than those receiving less of the antibiotic, the reaction being greatest in the animals that received no antibiotic.

All pigs which were given the vaccine survived a challenge with virulent hog cholera virus, while 9 of 10 unvaccinated pigs died of the disease.

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Toxoplasmosis in Pigs

A pregnant sow, in Germany, experimentally infected with Toxoplasma recovered from a pig, developed a complement-fixation titer of 1:600 in 18 days. Of her 9 pigs, 5 survived and Toxoplasma organisms were found in 4. A contact sow developed no serological reaction but Toxoplasma organisms were found in 2 of her 8 fetuses. Both sows had paralysis of the hindquarters for several weeks before slaughter.—Vet. Bull., June, 1956.

Swine Fever Eradicated Locally

A severe infection of swine fever (hog cholera) was eradicated from a district in Germany by the slaughter of all infected pigs and the vaccination, with 5 ml. of crystal violet vaccine repeated in two weeks, of the others (about 20,000). The movement of swine was strictly controlled.

—Vet, Bull., June, 1956.

New Blood Group Finding.—In studying blood groups in rabbits, seven erythrocyte antigens have been found. Contrary to previous thinking, antigens which were present in neither parent have been found in offspring. If this happened in other species, it could complicate tests for parentage.—

Science, May 25, 1956.

Survival of Leptospira in Soil

Soil from a sugar cane farm in Australia was experimentally infected with a culture of *Leptospira australis A* or by rats which were excreting leptospiras. After periods of eight to 43 days, the soil was flooded with rainwater which was later tested by guinea pig inoculation.

Leptospiras survived in culture-infected soil for 43 days, in rat urine-infected soil for 15 days prior to flooding, and in the water 24 days after flooding. The pH of the soil was 6.1 to 6.2 and of the water 6.6 to 7.6. The prevailing temperature was 68 to 85 F.—Vet, Bull., June, 1956.

Five persons were bitten by skunks in Lake County, California, in early March and, in 3 cases, the skunks proved to be rabid. One skunk which attacked two children in a playground was not found.—
Pub. Health Serv., May 26, 1956.

Observations on the Possible Relationship Between the Movement of Cattle and the Occurrence of the Warble Season

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THE WARBLE SEASON has been defined4 as the period from the first seasonal appearance of warbles in the backs of cattle until the emergence of the last one from the tissues of the host. The length of the warble season in different localities is believed to depend chiefly upon the latitude, the climatic conditions, and the species of warble fly present. From the various publications on the cattle warble problem, 2-4,7 it seems that the time of appearance and the length of the warble season are considered as well established for any given locality. The author was unable to find any previous report which dealt specifically with the movement of cattle from one latitude to another as a factor influencing the length and variations in the occurrence of the warble season.

This paper describes some cases typical of Hypoderma larvae-infected cattle, which had been transported from southern to northern states, as observed in the course of routine meat inspection. Such cattle, serving as carriers, may initiate irregularities in the occurrence of the warble season in the places to which they are transferred.

Time did not permit a thorough investigation and no attempt was made to identify the species of larvae found. It has been assumed that the larvae observed were those of *Hypoderma lineatum* only.

REVIEW OF LITERATURE

It takes about nine months¹ for the warble fly larvae to reach the back after hatching and burrowing through the animal's body. They spend about five weeks or longer under the skin of the back before they drop to the ground and become pupae. The pupation lasts six to ten weeks. In the central part of Texas, warble fly activity has been known to begin on the first warm days of February and to extend until the middle of March. In Vermont, the flies might be seen by the first of August. Not uncommonly, a few of the northern warbles (Hypoderma bovis) are found in cattle even in August.

In the latitude of the State of New York, the larvae first appear in the subcutis soon after Febru-

ary 1 and begin to emerge from the skin about March 15. The flies (H. lineatum) appear about April 15 and are active for about six weeks. At Auburn, Ala., the maximum fly activity occurs during the months of February, March, and early April, the larvae appear in the backs of the animals in November, and all drop out by the end of February; the greatest number reach the back during December.

Very little conclusive information is available concerning the length of the period from the first appearance to the disappearance of the larvae in the esophagus and the interval between this period and the first appearance of the larvae in the back. Hypoderma lineatum larvae have been reported as found in the walls of the esophagus chiefly in December and from December to mid-February, with a few detected both earlier and later. Larvae have also been found beneath the mucous membranes of the pharynx, the esophagus, and the anterior parts of the rumen from July to November.

Typical movement of cattle has been described from Texas auction sales to ranchers and farmers as far away as lowa, California, and Kentucky. Some animals were shipped from Texas to Kansas for grazing during the winter and from there to lowa for a year of feeding and fattening on corn.

OBSERVATIONS ON TRANSPORTED CATTLE

The following observations were made at a packinghouse at Grand Rapids, Mich.:

Lot 1.—On Dec. 8, 1955, 60 head of 2-year-old Hereford cattle, from the Chicago stockyards, were slaughtered. The postmortem inspection revealed that approximately 50 per cent of these cattle were harboring 15 to 40 Hypoderma larvae in the subcutaneous tissue of the back. Some of the larvae were dark in color. Several cattle, with larvae in their backs also had a number of larvae in the submucous layer of the esophageal wall.

The gross pathological changes in the esophagus were typical for animals brought from the Chicago stockyards and killed in December. The most characteristic pathological changes were: thickening of the submucous connective tissue, dirty yellowish gelatinous masses between the muscular coat and mucous membrane, reddening of mucous membrane, sometimes petechiae

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in the submucous layer, especially in the neighborhood of the larvae, and watery gelatinous masses in the mediastinal fat.

Lot 2.—On Jan. 10, 1956, 1 of 60 Hereford cattle brought from the Chicago stockyards had 20 or more white larvae in its back. No larvae or any gross pathological changes were found in the esophagus of that animal.

Lot 3.—On Jan. 11, 1956, 7 of 9 Aberdeen Angus cattle, 20 to 24 months old, brought from a farm located in western Michigan, were each harboring 3 to 25 brown to dark-colored larvae in their backs. No larvae or gross pathological changes were detected in the esophaguses of any of these cattle.

Lot 4.—On Feb. 1, 1956, 3 of 12 Hereford cattle, brought from Sioux City, Iowa, had Hypoderma larvae in their backs and esophaguses. One animal had at least 30 in the back and at least 10 in the esophagus. The majority of larvae in the back were small with dark stripes across their bodies. One was almost of the same size and general appearance as the larvae usually observed in the esophagus. The larvae in the esophagus were evenly distributed throughout the length of the organ. The gross pathological changes were comparable to those observed in lot 1 but of lesser extent.

DISCUSSION

According to the literature cited, the animals in the four lots must have been exposed to the oviposition of Hypoderma flies in the latitude of some of the southern states. It was assumed that all four groups of cattle had been moved several months previously from southern to northern states and finished for beef. In group 3, such an assumption was confirmed. The larvae probably would have begun to emerge from their backs a few weeks later and, depending upon the chances of survival of the pupal stage, to initiate a seasonally unusual appearance of warble flies.

The findings described in groups 1 and 4 are of interest in view of our present knowledge of the life cycle of the parasite. Since Hypoderma larvae appear in the subcutis of the back after they have migrated from the walls of the esophagus, the larvae would be supposed not be seen in the back and in the esophagus at the same time. Without the complete history of these cattle, it is difficult to evaluate the signifi-

cance of the simultaneous occurrence of the larvae in two distant parts of the animal's body. No previous reports were found on such an occurrence, and it was only seldom observed by the author. However, it may be common in cattle moved from one latitude to another. These cattle may have experienced two warble fly oviposition periods, the first somewhere in the south and the second, weeks later, after they were moved to a northern latitude. If this assumption is true, the animals were bearing two generations of the parasite in one year with the consequently greater damage to their health and increased economic loss.

Such doubled ovipositioning, resulting in two periods of the appearance of larvae in the animal's back, could mean an exceedingly prolonged warble season and an unusually large total count of larvae.

These observations seem to indicate that under certain conditions the movement of livestock may complicate the cattle warble problem considerably and minimize or even nullify the efficacy of area-wide warble control or eradication programs which, in general, are based on the principle that the flying range of the adult fly is very limited. The success of community eradication programs in some European countries in some fly the limited movement of livestock because of geopolitical boundaries.

With regard to some of the variable and unpredictable results obtained from experiments with various substances intended to destroy larvae in their migratory period, it might be of interest to determine how far the course of such experiments or observations was influenced by the movement of cattle, with resulting irregularities in the seasonal occurrence of various stages of the life cycle of the parasite.

SUMMARY

- The early seasonal appearance of warbles in the backs of four lots of cattle, presumably moved from southern to northern states, is reported.
- In two lots, Hypoderma lineatum larvae were found simultaneously in the esophagus and in the back, possibly the result of two ovipositioning periods.
- Possible complications of the cattle warble problem arising from the movement of livestock are discussed.

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Preserved Rumen Culture Is Inactive

An experiment was conducted with 16 sheep to determine the effect of dried preserved rumen inoculum on digestion.

Chloramphenicol was used to reduce the rumen flora in 8 lambs. Four of the 8 lambs received 10 Gm. of dried preserved rumen inoculum per day for 30 days following the chloramphenicol treatment. Four lambs received no further treatment. No differences were noted between the two lots in rate of gain and return to normal appetite.

Four lambs on a basal maintenance ration gained equally as well as 4 lambs which received the same ration plus 10 Gm. of dried preserved rumen inoculum

per day.

No toxic effects were noted from feeding the dried preserved rumen inoculum. Neither was there any benefit.—[James O. Tucker, M. W. Glenn, and G. W. Robertstad: Effects of Dried Preserved Rumen Inoculum on the Rumen Microorganisms of Lambs. Am. J. Vet. Res., 17, (July, 1956): 498-502.]

Analysis of Milk of Diseased Cows.— Examination of milk from 30 cows in a veterinary hospital, after surgery or in other diseased conditions in which the body temperature was not raised, showed no significant change in the fat or nonfat solids percentages. In 28 cows, which developed raised body temperatures, there was a fall in milk yield and a tendency for the fat percentage to increase and the nonfat solids to decrease as the temperature rose.

—J. O. L. King, Vet. Rec., April 28, 1956.

A Chelating Agent and a Toxin

The metal-chelating agent EDTA (ethylenediamine tetracetic acid), when injected into mice, consistently protected them against a lethal dose of Clostridium perfringens, type A, toxin. This toxin is an enzyme, a lecithinase, which is activated by metallic ions. The protective action of EDTA is undoubtedly due to its ability to chelate these metal ions. This suggests the possible use of chelating agents in the therapy of gaseous gangrene.—Science, June 15, 1956.

Resistance to Nematode Infection

When massive doses of exsheathed larvae of *Haemonchus contortus* were injected into the abomasum of anesthetized sheep, the organ remained flaccid in normal animals but showed increased peristalsis in ten minutes, and was pale, edematous, and contracted in an hour in 2 infected sheep. The reaction began to subside in two hours. —*Vet. Bull., June, 1956.*

Xerosin Suppresses Rous Sarcoma

Xerosin, a bacterial product which lacks any antiviral or antimicrobial activity and, therefore, can not be classified as an antibiotic, when given in daily intramuscular injections, both suppressed and modified virus-induced Rous sarcoma in baby chicks. When the Rous sarcoma virus was inoculated subcutaneously into the wing web of untreated chicks, the typical tumors were soft, grew rapidly, and were grossly invasive while those in xerosin-injected chicks were hard, sharply circumscribed, and grew slowly.

When xerosin injections were discontinued, the atypical tumors continued to grow slowly but none reverted to typical invasive tumors. However, when virus from these atypical tumors was injected into other chicks, they developed typical invasive tumors.—Science, June 15, 1956.

Nutrition

Vitamin B12 Synthesis in Sheep

The vitamin B_{12} blood level decreased rapidly in sheep on a cobalt-deficient ration, at Cornell University, but the lambs continued to eat and gain, suggesting that the vitamin is efficiently conserved in the tissues. The administration of cobalt increased the vitamin B_{12} level in the blood and tissues when given orally but not when given parenterally. However, when given parenterally, the vitamin B_{12} content of the large intestine increased, presumably as a result of bacterial synthesis following the excretion of the cobalt in the bile.—J. Anim. Sci., May, 1956.

Implanting Stilbestrol in Cattle

Three or four stilbestrol pellets (12 mg. each) implanted under the skin of the ear of fattening steers, at the University of Illinois, seemed to increase gains about as much as when the hormone was fed (12 mg. per day) and at a considerably lower cost. Intermittent injections at lower levels gave better results. One Illinois veterinarian is doing the job on a "per head" basis. Pellets can be used in cattle on pasture or highprotein roughage when stilbestrol can not be fed.—Prairie Farmer, April 21, 1956.

Relation of Calcium, Zinc, and Vegetable Protein to Parakeratosis

In a test with pigs 6 weeks of age, at Michigan State University, all of 10 pigs in group 1 developed parakeratosis in four weeks on a ration containing limestone (1.5%), dicalcium phosphate (0.9%), and zinc (31 p.p.m.), while only 3 of 10 in group 2 developed lesions on a similar ration containing limestone (0.5%), dicalcium phosphate (0.4%), and zinc (29 p.p.m.).

When, for group 3, 20 p.p.m. of zinc was added to the ration given group 1, only 1 of 10 pigs developed lesions and, when for group 4, 20 p.p.m. was added to the ration used for group 2, none of 10 pigs developed lesions.

At the end of eight weeks, when 20 p.p.m. of zinc was added to the ration for pigs in group 1, their appetites improved in a few days and their rate of gain tripled, but it required three to six weeks for the skin to return to normal.

An analysis of common feeds indicated

that the zinc content of soybean meal was 77 p.p.m.; of alfalfa meal, 32 p.p.m.; of corn 31 p.p.m.; of meat and bone scrap, 131 p.p.m.; and of bone meal, 146 p.p.m.

The substitution of plant protein concentrates for animal proteins in recent years could account for the increase in parakeratosis.—J. Anim. Sci., May, 1956.

Lime and Reproduction of Pheasants

The presence of limestone seemed to be a factor in the area distribution of pheasants. When pheasants were experimentally fed, egg production was good when they were given limestone grit but poor when given granite grit. Birds on granite developed normal ova but laid few eggs. Egg production increased when calcium carbonate was added to the diet. The scarcity of calcium may explain the absence of pheasants in certain areas.—Vet. Bull., April, 1956.

Nutritional Value of Range Plants

Young range plants are high in food protein, vitamin A, and phosphorus, but these nutrients decline and food fiber increases as the plants mature. During periods of drought or extreme cold, range plants become too coarse for palatability and may lack some nutrients.

The nitrogen content of a plant increases with the altitude. "Browse" plants are higher in protein, phosphorus, and vitamin A but supply less energy than grasses. Therefore, a supplement high in protein and phosphorus is more needed with grass. There is seldom a deficiency of calcium.

A vitamin deficiency may occur at midwinter, so a good leafy legume or commercial supplement is advised. Little mineral is needed in the Pacific Northwest but, in the southern Great Plains, phosphorus is required.—Armour's Anal., Jan., 1956.

Egg Diet Damages Arteries of Monkey

A monkey, at the Harvard School of Public Health, refused to eat unless fed a diet composed mostly of dried egg yolks, with pure cholesterol, minerals, and vitamins added. When destroyed three and one-half years later, extensive damage, similar to that seen in man, was found in the lining of the heart and in the blood vessels.

—Sci. News Letter, April 28, 1956.

The Family Doctor

Of considerable significance was the recent installation as president of the American Medical Association of a general practitioner, Dr. D. H. Murray, chairman of the Department of General Practice of a hospital at Napa, Calif. This indicates a healthy trend toward decentralization and reduced specialization in medical personnel and services; an effort toward restoring the close personal relationships that once existed between doctors and patients.

Dr. Murray recalled how, for 35 years, he had gone to his patients day or night when they were unable to come to him, and the personal touch this had produced. He reported that many medical schools, as they have been urged to do by the Association, are revising their curriculums so their students will get a broader preparation for general practice. He supported the concept that modern medical care must be a matter of team work, with no particular type of position considered the "golden boy," and thus entitled to "the lion's share of prestige and reward."

The new president indicated that no matter how complex specialized medicine becomes, there will have to be the equivalent of the family doctor—a "health coordinator" who will be "the first doctor for the patient to consult." Because of the increase in longevity of man (half lived beyond 30 years in 1900, half beyond 66 today), prolonged treatment is now more frequently required.

Mentioning the tremendous modern store of medical knowledge, skills, facilities, and drugs, Dr. Murray emphasized that there is no substitute for "kindness and understanding." This means taking more personal interest in the patient's problems and more time to explain as clearly as possible the factors which are involved.

A COURSE IN GENERAL PRACTICE

The new programs for training general practitioners at several medical schools are separately discussed in the June 23, 1956, issue of the Journal of the American Medical Association. One school has set up a division of general practice which "runs diagonally across the highly compartmented medical curriculum." During his second year, as an introductory course, each student is introduced to families in their

homes just to study them and their environmental conditions. Before his last year, he selects one or more families to be under his medical care, supervised by a practicing family physician, until he graduates.

At another school, the fourth-year medical students are taught the family physician's approach in the out-patient clinic. This involves a group of 15 students for a ten-week period, and includes home health service.

THE VETERINARY FAMILY DOCTOR

Although the problems of medicine differ from those in veterinary medicine, often quite markedly, nevertheless we can appreciate the need for, and the benefits which should result from, this trend. For the practicing veterinarian, a doctor-client relationship must be substituted in part for the physician's doctor-patient relationship, but the "warmth and understanding" that Dr. Murray emphasized as a "vital ingredient in the art of medicine" still applies both to the client and to the animal patient.

With reference to home calls, when dealing with animals, especially farm animals, there are often definite advantages in studying them in their home environment. Animals can't talk but their uninhibited actions can speak for them. Also, when one or a few animals are brought to a clinic, their symptoms and lesions may not be typical of the herd problem, thus confusing the diagnosis. Also, an accurate diagnosis may require a search of the premises for possible poisonous or injurious materials.

Furthermore, in some instances, unless management changes which will eliminate the etiological factors are studied in detail, or are even supervised, the veterinary service to which the client is entitled may be incomplete.

Veterinarians in Canada.—A survey of the veterinarians in Canada indicates that 796 (47.6%) of a total of 1,671 are in general practice, 96 (5.8%) are in small animal practice, 459 (27.5%) are in government service, 87 (5.2%) in provincial government service, 62 (3.7%) in municipal government service, 73 (4.3%) in teaching (including research), and 98 have other classifications. It is estimated that Canada needs 2,000 veterinarians.—Canad. J. Comp. Med. and Vet. Sci., April, 1956.

Current Literature

ABSTRACTS

Resistance of Milk to Streptococcus as Affected by Pasture Feeding

During the weeks just prior to and after cows were turned on pasture, milk samples were obtained and tested for resistance to acid production by Streptococcus agalactiae. This was accomplished by inoculating the samples with the Streptococcus and, following 24 hours of incubation, estimating the acid produced by titrating with 0:1 normal sodium hydroxide.

Samples collected in the weeks immediately after the feed change required more sodium hydroxide to neutralize them, indicating that they were less resistant than those obtained before the cows were put on pasture. The average increase for three pasture seasons from a total of 84 cows was 18.5 per cent; in one year, it was 27.5 per cent. Partial recovery in resistance occurred in the next two months and this was maintained to the end of the summer in one year but, in another, further losses again occurred toward the end of the season. The seasonal losses in resistance of the samples from the experimental herds paralleled the onset in other herds of extensive mastitis problems associated with Str. agalactiae .- [W. D. Pounden, Norma A. Frank, and W. C. Krauss: The Resistance of Milk Samples to the Activity of Streptococcus Agalactiae as Affected by Pasture. Am. J. Vet. Res., 17, (April, 1956): 227-230.]

Protective Antigen of Bacillus Anthracis in Cattle, Sheep, and Swine

Cattle, sheep, and swine were immunized by subcutaneous injections of two 5-ml. doses of an alum-precipitated, organism-free antigen prepared from sterile culture filtrates of either the NP-A or R1-NP strains of Bacillus anthracis grown in chemically-defined medium. These animals were challenged at various intervals with virulent spores of either the Vollum, 1062, V770, or V770-2-P strains. The latter strain, which was recovered from the heart blood of a cow at necropsy, appeared to be more virulent for guinea pigs; therefore, it was used for most challenges.

Attempts to produce fatal infections in normal cattle by various routes were unsuccessful until the spores were placed in a special cylinder of food and completely masticated. Solid immunity was present in cattle one month after immunization; the immunity had declined but appeared significant after eight and 12 months. Sheep were solidly immune three months after challenge, but less than complete survival was obtained one, six, seven, and eight months after immunization. Estimation of the immunity conferred to swine was difficult because fatal infection could not be produced in the normal animals. Results that suggested an increased resistance in swine were obtained two months after immunization by feeding

the carcasses of guinea pigs recently dead of anthrax. The challenge procedures for cattle and sheep were adjusted to provide a severe test of the resistance of the animals immunized with this antigen.

It would seem probable that the infective doses that would be encountered under natural conditions would be less severe. The technique to produce a fatal challenge in cattle by the oral route was consistent and should prove to be useful. The doses of the antigen were selected to be practical but presumably can be modified for greater effectiveness. The protective activity of the crude filtrate can doubtless be increased and the possibility of a more effective adjuvant than alum should be explored. This organism-free antigen has a distinct advantage over spore vaccines for the immunization of cattle and sheep against anthrax because it is sterile and nontoxic and practically eliminates deaths .- [A. S. Schlingman, H. B. Devlin, G. G. Wright, R. J. Maine, and Mary C. Manning: Immunizing Activity of Alum-Precipitated Protective Antigen of Bacillus Anthracis in Cattle, Sheep, and Swine. Am. J. Vet. Res., 17, (April, 1956): 256-

Particle Size and Anthelmintic Efficiency of Phenothiazine

Experiments utilizing natural nematode infections in range lambs and artificial infections with Nematospiroides dubius, Baylis, had demonstrated, in mice, that the anthelmintic efficiency of phenothiazine is inversely proportional to the diameter of the particles. When administered to sheep in a single dose, particles larger than 140 μ in diameter were ineffective. A preparation with a mean particle diameter between 40 and 50 μ was 70 per cent effective and one with a mean particle diameter between 1 and 2 μ was 95 per cent effective. The observation on lambs was confirmed with 0.5 per cent of phenothiazine in the ration of infected mice.

Suppression of ovogenesis in the nematodes was also inversely proportional to the diameter of the phenothiazine particles.—[James R. Douglas, Norman F. Baker, and William M. Longburst: The Relationship Between Particle Size and Anthelmintic Efficiency of Phenothiazine. Am. J. Vet. Res., 17, (April, 1956): 318-323.]

Experimental Actinobacillosis

A study was made of 14 strains of Actinobacillus lignieresi obtained from various stock collections of the United States and England, and also of organisms freshly isolated from granulomatous lesions of the heads and cervical regions of cattle in Florida.

A study of colonial morphology revealed the presence of dwarf, granular, and fluorescent variant colonies. Dwarf and granular types were more frequently found in freshly isolated cultures, while the fluorescent type predominated in stock cultures. All strains studied behaved alike in their bio-

chemical characteristics, with the exception of the American type culture collection, strain 10811, in regard to activity on fructose, xylose, sucrose, manitol, indol, urease, and H₂S production and nitrate reduction.

Because none of the strains studied completely matched the description presented in "Bergey's Manual," re-evaluation of the characteristics was suggested. Two bulls inoculated subcutaneously, on either side of the neck with freshly isolated culture, developed clinical granulomas at the site of inoculation three months following exposure. Three other cattle which were inoculated intramuscularly into the tongue, hard palate, and cheeks failed to develop clinical lesions at six months postexposure.

The 11-day-old chicken embryo was found to be susceptible to infection and useful in experimental studies of actinobacillosis. Numerous attempts to infect rabbits, guinea pigs, and hamsters, using subcutaneous and intraperitoneal routes of inoculation, failed. The Strauss testicular reaction was negative.

Histopathology of granulomatous lesions consisting of necrotic foci, containing one or more smaller rosettes surrounded by inflammatory cells and granulation tissues, occurred in naturally and experimentally infected cattle. The strains studied proved to be uniformly susceptible to aureomycin,® terramycin,® and chloromycetin,® as their lowest concentrations inhibited in vitro growth of all strains.—[M. Ristic, M. Herzberg, D. A. Sanders, and J. W. Williams: Actinobacillosis. I. An Evaluation of Cultural Characteristics of Selected Strains of Actinobacillus Lignieresi. Am. J. Vet. Res., 17, (July, 1956:555-562.)

Modification of Barbiturate Anesthesia

Experiments show that the anesthetic action of barbiturates can be profoundly affected by glucose, intermediary metabolites, and certain other substances of widely diverse nature. This action is confined to animals anesthetized with barbiturates and varies greatly in different species. Of some 100 normal dogs anesthetized with active barbiturates and, on waking, injected with glucose, 25 per cent would go back to sleep, 50 per cent gave doubtful results, and 25 per cent showed no effect. Lactate, pyruvate, and certain other substances produced a more regular and powerful effect than glucose. Several hundred guinea pigs (wt. 500 Gm.), upon awakening after being given hexobarbital intraperitoneally at the rate of 60 mg. per kilogram of body weight in a 2 per cent solution, returned to sleep when given 1 ml. of a 2 M (molar) solution of glucose,

Upon waking, some of the guinea pigs were destroyed and, on examination by spectrophotometric methods, their brains contained 30 mg. of hexobarbital per gram of brain. If glucose was injected after the barbiturate level of the brain was estimated to be below 20 mg. per gram of brain, the guinea pig did not return to sleep. Glucose, lactate, and sucrose did not raise the barbiturate

concentration level in the brain; but lactate, pyruvate, and glutamate caused an increased rate of barbiturate entrance into the brain. Glucose, although potentiating the action, had little or no effect in increasing the permeability of the brain to barbital.

The median anesthetic dose and the anesthetic lag of barbital was definitely lowered by glucose and markedly lowered (some 5 times) by certain metabolites.

Epinephrine administered alone caused the "glucose effect," and potentiated the glucose effect when injected with lactate. Pitressin, in contrast, produced no glucose effect.

The administration of acetylcholine to guinea pigs with glucose or lactate, after they had wakened from barbiturate anesthesia, prevented the return to sleep which was usually observed. Also, acetylcholine blocked the effect of lactate, pyruvate, or glutamate by decreasing the rate of entrance of barbital into the brain.—[P. D. Lamson, M. E. Greig, and C. J. Hobdy: Modification of Barbiturate Anesthesia by Glucose, Intermediary Metabolites and Certain Other Substances. J. Pharmacol. and Exptl. Therap., 103, (1951): 460.]—IOHN W. CABLE.

Physiological Differentiation of Vibrios

A number of physiological activities and growth characteristics of 66 Vibrio cultures from lower animals and man, as well as from soil, water, and cheese, were studied. Catalase activity, reactions in litmus milk, hydrogen sulfide, indole, nitrate and urease production, liquefaction of gelatin, minimum and maximum temperatures for growth, and sodium chloride tolerance during growth offer means of differentiating Vibrio species and types.

The effects of varying the concentration of agar in a fluid medium, addition of agar to nutrient gelatin and litmus milk, and pH tolerance were investigated.

Studies of different characteristics directed attention to sodium chloride tolerance during growth as an additional means of separating various strains of Vibrio fetus which were catalase-positive, hydrogen sulfide-negative from those of Vibrio sp. of bovine origin which were catalase-negative and hydrogen sulfide-positive.—[C. D. Kuzdas and E. V. Morse: Physiological Characteristics Differentiating Vibrio Fetus and Other Vibrios. Am. J. Vet. Res., 17, (April, 1956): 331-336.1

FOREIGN ABSTRACTS

Virus Pneumonia of Pigs

A severe epizootic of pneumonia in swine was observed in Morocco during the spring of 1952. This disease has not been observed in France. The causative agent appears to be related to the Shope swine influenza virus.

The lesion observed in natural and artificial infections is a progressive atelectasis, starting with the apical and cardiac lobes but, in many cases, affecting the entire lung.

Pigs vaccinated against hog cholera were shown to be susceptible to this disease.

Subcutaneous and intramuscular injections failed to produce any reactions. Intratracheal and intrapleural injections of large doses of centrifuged lung suspension, filtered or treated with antibiotics, produced typical clinical and pathological reactions.

Pigs vaccinated three times with Newcastle disease egg vaccine were resistant to this Moroccan swine virus.

The lung suspensions failed to produce pneumonia when injected four days after large doses (100 cc.) of anti-hog cholera serum or normal horse serum.

The disease is readily transmitted by contact. Recovered animals may spread the disease 90 days after recovery.

Rabbits are refractory to the virus. Rats injected intratracheally and intrapleurally developed signs of pneumonia. Guinea pigs and mice were infected by filtered lung emulsions. Death occurred in guinea pigs after 18 to 22 days, in mice after six to ten days.

Filtrates from affected lungs obtained from natural or artificial infections failed to agglutinate chicken erythrocytes. Attempts at egg passage were not successful.

Pigs inoculated with Shope virus and Swedish "Sanda" virus remained susceptible to the Moroccan virus. No immunity or neutralizing action was produced by injections of Moroccan virus.

The failure to infect chicken embryos and to produce neutralizing substance suggests that this virus is similar to the Sanda virus.—[L. Placidi and J. Haag: Virus Pneumonia of Pigs. A Clinical and Experimental Study of an Epizootic in Morocco. I. Clinical Study. II. Experimental Studies. Rec. méd. vét. d'Alfort, 132, (1956): 5-20; 89-105.]—J.P.S.

Leptospirosis in Horses

Twelve colts were experimentally infected with Leptospira cultures of various serological types isolated from horses, cattle, foxes, and swine. Six spontaneous cases were also studied. The clinical course, clinical pathology, and postmortem pathology were described. The only ophthalmic symptoms mentioned were congestion and icterus of the conjunctiva. Chronic cases were observed up to 442 days. The disease was characterized by intermittent fever, anemia, icterus, and degenerative and atrophic processes of the kidney and liver. The microagglutination lysis test became positive after the fourth to sixth day and reached a titer of 1:10,000 to 1:100,000 .- [S. Y. Liubasbenko, B. G. Ivanov, and A. F. Tiulpanova: Clinico-Pathologic Characteristics of Spontaneous and Experimental Leptospirosis in Horses. Veterinariya (Moscow), 32, (Dec., 1955): 14-20.]-ROBERT E. HABEL.

BOOKS AND REPORTS

Anatomy of Domestic Animals— Part One—Head and Neck

This is a splendid text on the application of anatomical knowledge of the head and neck regions of our domestic animals. However, the variations in the anatomical nomenclature used creates a big issue in the field of anatomy.

Figures make a more lasting impression than words; therefore, a greater effort should have been made to have them accurate in the topography of structures. Figures 3, 28, 29, and 30 do not agree in the location of the infraorbital foramen. Figure 3 shows it located much too low.

In figures 7, A and B, and 8, A and B, showing the "mandibular joint in the dog," the obliquity of the condyle of the mandible is much exaggerated. The condyle usually slopes slightly downward and forward toward the median line.

Figure 49, "skull of the horse, side view," shows a specimen from a 2-year-old, and this should have been indicated.

In figure 54, "topography of the maxillary sinus of the horse," line "a" should have been shown passing forward from medical canthus of the eye to the infraorbital foramen to avoid injury to the nasolacrimal duct which lies in the outer plate of bone along this line.

A lateral view of the entire skull of the horse, sculptured to show the interior of the maxillary sinus, could well have replaced figure 55, "interior of the maxillary sinus in the horse."

Figures 72, 73, and 74 are excellent. They show changes taking place in the teeth and the maxillary sinus of the horse with increasing age.

Figure 91, "topograhy of the brain and the frontal sinuses" in the ox, would have been of more value if a dorsal view of the skull, sculptured and labeled to show the maxillary sinus and its compartments, had been placed in the text for comparison.—[Regional and Applied Anatomy of the Domestic Animals, Part One—Head and Neck. By John A. Taylor. Oliver and Boyd, Ltd., Tweeddale Court, Edinburgh 1, Scotland. 1955. Price about \$3.50.]—]AMES D. GROSSMAN.

Sex in Microorganisms

This text, published in 1954, has an intriguing title but is too technical to be of interest to any except advanced scientists. It speculates on the origin and evolution of sex in organisms but does not attempt to define sex. The chief conclusion is that "continued research . . . may . . . find answers . . . to the problems . . . to be solved."—[Sex in Microorganisms. Edited by D. H. Wenrich, Ivey F. Lewis, and John R. Raper, American Association for the Advancement of Science, 1515 Massachusetts Ave., N.W., Washington 5, D.C. 1954, Price \$5.75.]—W.A.A.

THE NEV

Southern V.M.A. to Hold Business Session in San Antonio

The Southern Veterinary Medical Association will hold only a business session in 1956, it having been agreed, when October dates were selected for the 1956 convention of the AVMA, that the Southern V.M.A. would forego its regular annual meeting customarily held in October.

As a result, arrangements have been approved by Drs. Thomas J. Jones, president, and A. A. Husman, secretary, respectively, whereby the Southern V.M.A. will convene at 2 p.m. on Tuesday, October 16, in the North Terrace of the Gunter Hotel, San Antonio.

The Women's Auxiliary of the Southern association will convene at the same hour in the South Terrace of the Gunter.

Members of both organizations are urged to be present for the transaction of such business as must come before them at San Antonio.

COMMENCEMENTS

University of Illinois.-At the 1956 commencement exercises of the College of Veterinary Medicine, University of Illinois, the following 29 candidates were presented for the D.V.M. degree:

Warren N. Anderson Marjorie T. Brown Richard J. Brown Irvin C. Bunn Vincent W. Chaffee Robert C. Dodson Gilbert C. Fischer Albert O. Griffiths Howard P. Hobson

William E. Hopkins Gordon J. Iverson Robert G. Kern Marlin D. Kleckner Paul G. Leondis Charles E. Lewis Thomas A. Maudlin David A. McConnell Robert C. Morris

Graduating Class, 1956, College of Veterinary Medicine, University of Illinois















UNIVERSITY OF ILLINOIS COLLEGE OF VETERINARY MEDICINE







































Top row (left to right)-Merrill W. G. Ottwein, Howard P. Hobson, Gilbert C. Fischer, William E. Hopkins, Richard J. Brown, Robert C. Dodson, David A. McConnell, Thomas A. Maudlin.

Second row-Ronald G. West, Paul G. Leondis, Marjorie T. Brown, Albert O. Griffiths.

Third row-Warren N. Anderson, Irvin C. Bunn, David R. Warren, Vincent W. Chaffee, Dean Graham, Mike Pellock, Gordon J. Iverson, Marlin D. Kleckner, Howard P. Peterson,

Fourth row-Robert G. Kern, Charles E. Lewis, John P. Rosborough, Robert C. Morris, Gregg W. Taylor, Paul S. Quinn, Robert Twardock, Wayne R. Sanderson, Charles R. Rossi,

Metrill W. G. Ottwein Mike Pellock Howard P. Peterson Paul S. Quinn John P. Rosborough Charles R. Rossi Wayne R. Sanderson Gregg W. Taylor Robert Twardock David R. Warren Ronald G. West

U. S. GOVERNMENT

Dr. Stein Retires.—Dr. C. D. Stein retired from the Agricultural Research Service on March 31, 1956, after 45 years of continuous service in the United States Department of Agriculture. Dr. Stein received his



Dr. C. D. Stein

V.M.D. at the University of Pennsylvania in 1911 and immediately entered the Meat Inspection Branch of the Bureau of Animal Industry. He later served in the Virus Serum Control Division, the Pathological Division, and in the Animal Disease and Parasite Research Branch of the BAI and of the ARS. Dr. Stein's special knowledge of the diseases of horses was recognized throughout the world. He was considered an authority on equine infectious anemia and anthrax and is the author of many articles on these and other infectious diseases. At the time of retirement he was honored with a banquet and was presented with a gold wrist watch, a portfolio of letters from friends and colleagues, and a collection of his scientific publications.

S/HOWARD W. JOHNSON.

AMONG THE STATES AND PROVINCES

Alabama

Annual Conference.—The forty-ninth annual conference for veterinarians was held at the Alabama Polytechnic Institute, Auburn, on July 22-25, 1956.

Guest speakers and their subjects included in the conference were: Kenneth McEntee, Cornell University, Ithaca, N. Y. (infertility in cattle, vibriosis); W. H. Riser, Skokie, Ill. (distemper prophylaxis, external ear drainage, clinical cases); Gordon D. Wallace, public health veterinarian, Montgomery (rabies); E. P. Leonard, Cornell University, Ithaca, N. Y. (canine stifle, artificial insemination); F. D. Maurer, Walter Reed Army Medical Center, Washington, D. C. (mucosal disease, rhino-Washington, D. C. D. Van Houweling, ARS, Washington, D. C. (disease prevention and control); L. L. Boley, Cutter Laboratories, Kewance, Ill. (erysipelas, stomach tube, vena cava); Harold W. Nance, Lawrenceburg, Tenn. (portable squeeze and operating table); G. H. Conner, Michigan State University, Lansing, Mich. (oral dosage, uterine infusion, bovine surgery); A. D. Rankin, E. R. Squibb and Company, New Brunswick, N. J. (foot lameness, stomach tube speculum and floats, equine castration); John L. Durr, U.S.A.F., Greenville, S. Car. (coxofemoral luxation); C. S. Davis, Orlando, Fla. (intracerebral inoculation); and J. W. Hazelrig, W. R. Cryar, both of Birmingham, and C. L. Holloway, Mobile (electrocardiogram).

The following staff members of the Alabama Polytechnic Institute also participated in the conference: C. H. Clark (electrocardiography); G. K. Kiesel (overgrown hooves, cable catheter); W. J. Gibbons (oral dosage); J. H. Watt (casting harness); F. G. Schell (equine castration); L. E. Evans (estrogens); C. S. Roberts (green oat toxicity); and J. T. Vaughan, W. M. Dillard, and B. F. Hoerlein (clinic demonstrations).

Colorado

Dr. Miller Receives Sabin Award.—Dr. N. J. Miller (CVC '08), of Eaton, recently received the Florence R. Sabin award for outstanding contributions to public health in the state of Colorado. Dr. Miller has served continuously in the Colorado House of Representatives or Senate since 1942 and has been a leader in the improvement of public health laws. He also has an enviable record of public service in his home community. He received the AVMA award at Seattle in 1954.

S/MARTIN D. BAUM.

Illinois

Pet Food Manufacturers.—The second annual convention for Pet Food Manufacturers, sponsored by the American Feed Manufacturers Association, will be held at the Drake Hotel, Chicago, Ill., on Sept. 20-21, 1956.

The opening session will be devoted to the nutrition and disease problems of pets as well as feed-control relations. Opening speakers will include Dr. Wayne H. Riser, secretary of the American Animal Hospital Association, Skokie;

Dr. J. E. Hunter, Allied Mills, Inc., Libertyville; and Dr. Paul H. Phillips, University of Wisconsin, Madison.

Kansas

State Association .- At its semiannual meeting held in Manhattan on June 1, 1956, the Kansas Veterinary Medical Association voted unanimously to support the Army and Air

Force Veterinary Corps.

The Hon. Fred Hall, governor of Kansas, appointed Dr. Fred B. Ogilvie, Kansas City, to a three-year term on the Kansas State Board of Health. Dr. Ogilvie succeeds Dr. T. P. Crispell, Parsons, who had served the two terms allowable under the statutory limitation. s/K. MAYNARD CURTIS, Secretary.

Kentucky

State Association .- The forty-fifth annual meeting of the Kentucky Veterinary Medical Association was held at the Seelback Hotel,

Louisville, on July 16-17, 1956.

At the Monday session, the Hon. Ben Butler, commissioner of agriculture, L. L. Breeck, state veterinarian, and E. E. Coshow, ARS, U.S.D.A., all of Frankfort, discussed the status of state programs. Other reports were presented by R. L. Hectorne and R. E. Teague, both of Louisville (state board of health and veterinary medicine); James W. Newberne, Pitman-Moore Company, Zionsville, Ind. (care and diseases of chinchillas); Vernon Tharp, Ohio State University, Columbus (surgical techniques); Robert E. McClelland, Buffalo, N. Y. (small animal practice); and William McGee, Lexington (equine practice). After a business meeting, a cocktail party, banquet, and dancing were enjoyed by all.

The Tuesday program included the following speakers and their subjects: Dr. Tharp, Columbus, Ohio (bovine sterility); J. A. Winkler, Cold Spring (ethics); Dr. McClelland, Buffalo, N. Y. (surgical procedures); and a panel discussion given by Drs. McClelland, Tharp, McGee, Newberne, Breeck, and Hectorne. Dr.

Winkler served as moderator.

S/ROBERT H. SINGER, Secretary.

Maine

State Association.-The summer meeting of the Maine Veterinary Medical Association was held in Lakewood, July 11, 1956. The program included sports, a business meeting, a social hour, banquet, and a play. Dr. Stanford D. Merrill spoke on Maine's poultry industry and Dr. M. Rasheed Amr, Cairo, Egypt, spoke of the veterinarian in Egypt.

Michigan

Officers of State Association .- At a recent meeting of the Michigan State Veterinary Medical Association, the following officers were elected for the 1956-1957 term: Kenneth H. Fraser, Niles, president; Stephen R. Kelly, Detroit, president-elect; Charles Coy, Hillsdale, first vice-president; William Mackie, Lapeer, second vice-president; A. R. Wingerter, Big Rapids, third vice-president; and Paul V. Howard, Grand Rapids, secretary-treasurer. S/PAUL V. HOWARD, Secretary.

New Jersey

Metropolitan Association .- At the annual meeting of the Metropolitan New Jersey Veterinary Medical Association held on April 18, 1956, the following officers were elected for the 1956-1957 term: William J. Foster, Clifton, president; John W. Rich, Arlington, vicepresident; and Myron S. Arlein, Maplewood,

secretary-treasurer.

The Association conducted its first Canine Surgical Symposium on June 27, 1956, at the Hotel Berkeley-Carteret in Asbury Park. Total attendance was 425, of which 250 were veterinarians. The program included the following guest speakers and their subjects: Robert P. Knowles, Miami, Fla. (anesthesiology); C. Lawrence Blakely, Boston, Mass. (hernias); Marlin Perkins, director, Lincoln Park Zoo, Chicago, Ill. (experiences in zoo operation); Richard L. Rudy, Ohio State University, Columbus (reconstructive surgery); J. Markowitz, M.D., University of Toronto, Toronto, Ont. (abdominal surgery); and Russel J. Beamer, Texas A. & M. College, College Station (pre- and postoperative care).

S/MYRON S. ARLEIN, Secretary.

Wisconsin

Dr. McNutt Heads Veterinary Department .-Dr. S. H. McNutt (ISC '17) has been elected by the members of the Department of Veterinary Science, University of Wisconsin, as their chairman for the ensuing year. He succeeds Dr. C. A. Brandly who resigned to become dean of the School of Veterinary Medicine at the University of Illinois.

Dr. McNutt served in various capacities as a veterinary pathologist and in research at Iowa State College from 1917 to 1945. He has been professor of veterinary science at the University of Wisconsin since 1946. He is author or co-author of some 60 articles on a wide variety of diseases of domestic animals. At present, his primary interests are diseases of reproduction

and some virus diseases.

Wyoming

State Association .- The annual summer meeting of the Wyoming Veterinary Medical Association was held at Pinedale, June 9-11, 1956.

The Saturday program included the following speakers and their subjects: Victor J. Cabasso, Lederle Laboratories Division, American Cy-

anamid Co., Pearl River, N.Y. (modified live viruses in human and animal diseases); R. E. Pierson, Colorado A. & M. College, Fort Collins (advances in cattle and sheep diseases); J. E. Mosier, Kansas State College, Manhattan (problems in small animal practice); R. E. Udall, Colorado A. & M. College, Fort Collins (urinary calculi problem); George Thomas, ARS, Laramie (preparation of blood samples for anaplasmosis); G. H. Good, state veterinarian, Wyoming (grant-in-aid for veterinary students); Gail Hawley, Chas. Pfizer and Co., Inc., Brooklyn, N. Y. (feedlot experiments with diethylstilbestrol); O. H. Engendorff, Department of Commerce and Agriculture, Wyoming (meat inspection in Wyoming); Douglas J. McCluskie, city veterinarian, Denver Department of Health, Colorado (meat inspection); and Martin D. Baum, Colorado Department of Health (local veterinarian in public health).

The Monday program included the following speakers and their subjects: E. S. Norton, Lander (sucostrin in castration); P. E. Madsen and J. A. Wilson, Sheridan (oophorectomy in the nfare); J. E. Ketcham, Cheyenne (semen collection in the bull and ram); E. S. Stone, dean, Washington State College School of Veterinary Medicine, Pullman (three-dimensional photography); J. E. Rasmussen, veterinarian in charge, Wyoming (ARS activities); J. E. Mosier (small animal surgical techniques); E. J. Anderson, Washington, D. C. (animal disease prevention and control); Victor J. Cabasso (prophylaxis against canine viruses); and R. E. Pierson (large animal cases).

The following officers were elected for the 1956-1957 term: E. S. Norton, Lander, president; J. E. Ketcham, Cheyenne, president-elect; and J. F. Ryff, Laramie, secretary-treasurer.

s/J. F. Ryff, Secretary.

DEATHS

★William Caslick (COR '27), Paris, Ky., died on June 3, 1956, as a result of complications from an injury by a horse two weeks earlier.

Born at Deckersville, Mich., in 1901, Dr. Caslick graduated from high school and then entered Cornell University where he received his D.V.M. degree in 1927, having received an award for outstanding work in pathology and bacteriology. He was successively engaged in poultry diagnostic work, general practice, and veterinary milk inspection for a large dairy company in New York until he went to Kentucky in 1936 to enter practice with his brother, the late Dr. E. A. Caslick.

For a few years, he was veterinarian at a Thoroughbred stud farm in Virginia and then returned to Kentucky to accept a similar position with another large stud.

A few years later, he started a general prac-

tice in Paris where he built a combined large and small animal hospital.

Dr. Caslick held membership in the Kentucky V.M.A., AVMA (joined in 1928), and other professional societies including Phi Zeta, veterinary honorary society, and Omega Tau Sigma. He was also a Mason and a member of the Methodist Church.

Surviving are his widow, the former Winona Teeter, his parents, three sisters, a brother, and several nieces and nephews.

★William H. Haskell (UP '12), 67, Jacksonville, Fla., died May 22, 1956. Dr. Haskell worked for the U. S. Bureau of Animal Industry for a time after graduation, then served in the Army Veterinary Corps during World War I, attaining the rank of captain. He was meat and milk inspector and also practiced in Beaumont, Texas, for a number of years; was one of the first three milk sanitarians employed by the U. S. Public Health Service when that agency inaugurated its milk sanitation program nationally about 1925 and so served until 1947 when he became director of programs for Klenzade Products, Inc.

Dr. Haskell was recognized by public health workers as an authority in the fields of milk, ice cream, and food sanitation. He was a pioneer in the development of seminars for inspectors and of training courses for milk and food handlers. He is survived by his widow, the former Lynet Plumley, two daughters, and one son. Interment was in Arlington National Cemetery.

Clarence E. Hammonds (KCV '15), Girard, Ill., died March 7, 1956. Dr. Hammonds had practiced in Girard for 40 years.

Edward J. Higgins (KCV '09), 81, Orient, Iowa, died in June, 1956. Dr. Higgins spent his professional life in general practice until his retirement in 1951. He was born in Ireland in 1874 and came to this country as a young man in 1889. Dr. Higgins is survived by two daughters.

Samuel H. Laws (KCV '05), Kansas City, Mo., died April 1, 1956. Dr. Laws was a small animal practitioner.

J. H. Odgers (CVC '14), 73, DeWitt, Iowa, died June 2, 1956. Dr. Odgers had practiced in DeWitt from 1914 until his retirement in 1937. His widow survives.

A. R. B. Richmond (ONT '11), Toronto, Ont., died Dec. 18, 1955. Dr. Richmond was director of food control, Department of Public Health, Toronto, until his retirement in 1949.

J. L. Robinson (CVC '14), Des Moines, Iowa, died March 29, 1956. Dr. Robinson had been associated with the Diamond Serum Company for many years.

^{*} Indicates members of the AVMA.

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Department of Veterinary Medicine

The Postconvention Adjourned Session in Mexico City

When the 1956 AVMA meeting reconvenes in Mexico City on October 20, following the San Antonio convention, the adjourned final session will be held in the brand-new veterinary school on the beautiful campus of 404-year-old University of Mexico in the ultramodern surroundings of new University City about 10 miles south of the capital.

The whole area is spectacularly impressive—the accompanying pictures do it scant justice because they do not show the colors of the murals, mosaics, painting, and sculpture, the contribution and product of more than 150 of Mexico's best designers and artists who teamed up a few years ago to plan and beautify the new Cindad Universitaria—University City—when the government decided, under the leadership of then President Aleman, that the 28,000 students needed a new home.

There followed the biggest single construction job in Mexico since the building of the famed Halls of Montezuma in about 1500. The location is the site of an ancient lava bed and much of that rock has been used in the walls and other construction of buildings and walks on the campus.

UNIVERSITY AND SCHOOL ARE OLDEST IN NORTH AMERICA

In spite of new surroundings and buildings, the University of Mexico and its veterinary school are the oldest in their respective categories of any in North America. The University was established in 1552—more than 80 years before the U.S.'s oldest—and the Veterinary School in 1853, making it now 103 years old as compared to North America's oldest

-Ontario Veterinar, College-founded in 1862 and now in its 94th year of continuous operation.

The National Autonomous University of Mexico— Universidad Nacional Autonoma—is a center of mass education, open to anyone with certain minimum secondary schooling and \$20 a year tuition (in 1953). It holds a commanding position in the Latin American intellectual world, some 5,000 non-Mexican students enrolling each year in its 15 colleges which include architecture, chemistry, engineering and mathematics, physics, commerce, law, medicine, dentistry, veterinary medicine, and others.

Many of its faculty leaders were trained in the United States and other countries; academic independence and self-government—a u i o n o m a—have been traditional.

THE VETERINARY SCHOOL—"LA ESCUELA NACIONAL DE MEDICINA Y ZOOTECNIA"

As the name indicates, the course in veterinary medicine in Mexico includes so-called zootechnics or animal husbandry training. This combination is traditional in all Latin American veterinary colleges. There are strong advocates and good reasons for such an arrangement in those countries. Private veterinary practice, as it exists on a big scale north of the border, is scarcely known in Mexico and South America, except for some small animal specialization in cities and towns.

Also, disease control measures, including prophylaxis, are not carried out by private practitioners to any appreciable extent but rather by government veterinarians and the livestock and poultry owners



Compania Mericana Foto, S.A.

An air view of the University of Mexico, showing the school of veterinary medicine (arrow).



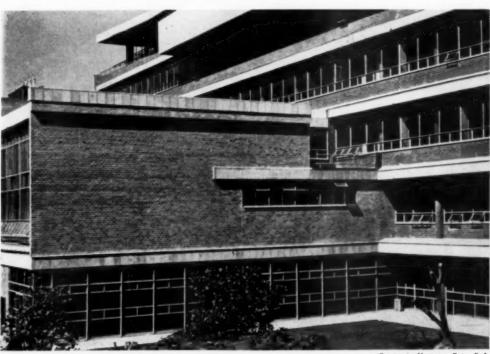
-Compania Mexicana Foto, S.A.

Close-up views of the School of Veterinary Medicine at the University of Mexico. The lower picture shows interesting architectural detail.

themselves. This is readily understood when it is realized that there are only about 400 veterinarians in all of Mexico.

The faculty of the Mexican veterinary school comprises some 40 full-time and 30 part-time members. This compares favorably with other schools in North America. Student enrollment is about 50 per class, with a total of some 275 in its five-year course, which, for graduation and degree, must include at least six months work in some field of veterinary medicine and completion of an original thesis.

(Continued on page 26)



School of Veterinary Medicine, University of Mexico.

-Compania Mexicana Foto, S.A.

TOUR SCHEDULE AND TENTATIVE PROGRAM OF ADJOURNED SESSION

As previously announced in the JOURNAL, and described in the tour leaflet sent to all members, following is the schedule for Saturday, October 20, the day on which the Adjourned Session will be held:

9:00 a.m.—Tour group leaves Hotel del Prado for sightseeing in Mexico City.

Noon-Arrive at University City.

- Inspection of new National School of Veterinary Medicine.
- 2) Adjourned Session in Conference Room.
- 3) Luncheon in school restaurant.

The following tentative program of the Adjourned Session has been arranged through the excellent cooperation of Dr. Oscar Valdes Ornelas, director of the Veterinary School:

Music by University Music Group

Call to order—Dr. Floyd Cross, Retiring AVMA President.

Welcome—President of the University or Dean Ornelas.

Response-Chairman of AVMA Executive Board.

Introduction of officers of Mexican College of Veterinarians, other Mexican dignitaries, and their opposite members from U. S. and Canada; also foreign guests.

Remarks by President of the Mexican College of Veterinarians, Dr. Alphonso Alexander, and other representatives of the Mexican profession. Introduction of AVMA Incoming President, Brig. Gen. Wayne O. Kester.

Closing remarks by General Kester.

Final adjournment of Ninety-Third AVMA Meeting.

In the late afternoon, the tour party will return to the Hotel Del Prado where, at 7 p.m., a reception and cocktail party will be held for Mexican and U. S. dignitaries and guests, followed by dinner.

This adjourned session in Mexico City promises to be one of the most enjoyable the Association and its members have ever experienced.

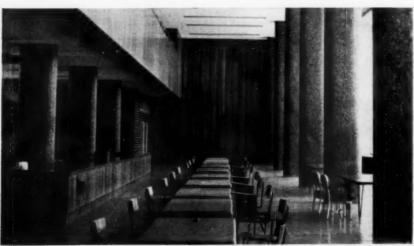
THE CLIMATE AND OTHER FACTS ABOUT MEXICO

Mexico City has a very high altitude—nearly 7,400 feet—and a wonderful climate. Because of the altitude, visitors will do well to take things slowly to avoid over-fatigue.

There are no sharply defined seasons but the rainy months are June through September. Temperatures in October range from 50 to 70 F., with an average of 60 F. Mornings are usually sunny; Mexico City is said to have more sunshine than any other large city in the world.

The capital, officially known as Mexico D. F., (Federal District) has a population of nearly 3½ million. It is a beautiful city of fine ultramodern buildings and ancient ones of Spanish origin. Broad, tree-lined boulevards—avenidas—lead from the business district for miles through fine parks and residential areas of beautiful homes.

There are many fine shops and restaurants. The unit of Mexican currency is the peso, the present exchange rate being about 8 pesos to \$1 U. S.



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The interior of the library of the School of Veterinary Medicine at the University of Mexico.

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Veterinary Laboratories KANKAKEE, ILLINOIS

All Members Invited to the Military Party at San Antonio

The dinner party for military veterinarians is open to all members of the AVMA and their ladies attending the convention. The Fourth Army Officers' Club at Fort Sam Houston, Texas, is the location of the party; the date is Oct. 15, 1956, and the time is 7:30 p.m.

The committee has made a few changes which will reduce the cost to \$8.00 per person. Entertainment for this party includes cocktails, a large buffet-type dinner and a dance orchestra for those who desire to dance. The function will be informal with plenty of time for visiting with friends.

The party is limited to 200 on a first-come reservation basis. It is contemplated that certain members of the AVMA official family will be present which includes General Young, General Kester, and their wives.

It is suggested that reservations be made before September 1, by mailing to Lt. Colonel Clinton L. Gould, V.C., station veterinarian, Fort Sam Houston, Texas, a check or money order for the number of tickets desired.

WOMEN'S AUXILIARY

President—Mrs. Earl N. Moore, 636 Beall Ave., Wooster, Ohio. Secretary—Mrs. F. R. Booth, 3920 E. Jackson Blvd., Elkhart, Ind.

Women's Auxiliary Business Sessions at San Antonio.—The thirty-ninth annual meeting of the Women's Auxiliary to the AVMA will be held Oct. 15-18, 1956, in San Antonio, Texas, during the Ninety-Third Annual Meeting of the AVMA. The Plaza Hotel is headquarters for the Auxiliary, and all of its meetings and some other activities will be held there.

On Tuesday, October 16, at 9:00 a.m., the House of Representatives will meet, with the president-elect (now acting president) Mrs. A. E. Coombs, presiding. Only accredited representatives have voting power, but all women are invited to attend this meeting. The annual business meeting will be held Wednesday, October 17 at 9:00 a.m.

A special breakfast will be held for the delegates at 8:00 a.m. on Tuesday, October 16.

Kentucky Auxiliary.—The Women's Auxiliary to the Kentucky Veterinary Medical Association held its annual meeting on July 16, 1956, at the Seelbach Hotel, Louisville, in conjunction with the annual meeting of the Kentucky Veterinary Medical Association.

The activities included an informal reception, a luncheon followed by a program, and a business meeting.

Instructions to Authors

JOURNAL of the AVMA

Exclusive Publication.—Articles submitted for publication are accepted with the understanding that they are not submitted to other journals, which is ethical publication procedure.

Manuscripts.—Manuscripts, including footnotes, references, and tables, must be type-written, double-spaced, on 8½- by 11-in. bond paper, and the original, not the carbon copy, submitted. One-inch margins should be allowed on the sides, with 2 in. at top and bottom. Articles should be concise and to the point. Short, simple sentences are clearer and more forceful than long, complex ones.

Illustrations.-Photographs should be furnished in glossy prints, and of a size that will fit into the JOURNAL of the American Veterinary Medical Association with a minimum of reduction. Photomicrographs which can not be reduced should be marked for cropping to 1-column or 2-column width. Identifying marks within the photomicrographs, such as arrows, letters, or numbers, should be clearly marked with black India ink or white opaque ink to insure good reproduction and must be large enough to stand reduction, if necessary. Drawings, graphs, and charts should be made clearly and accurately in India ink on white paper and a glossy print of them submitted when possible. Numbers or letters appearing on graphs or charts should be large enough to allow for any reduction necessary for the chart or graph to fit JOURNAL pages. Blue lines in graph paper drop out in reproduction; therefore, if lines are required they must be drawn in black ink. All illustrations should bear the name of the author and the illustration number on the back.

Tables.—Tables should be simple and typed double space. Complex tables are not conducive to perusal. It is wiser to summarize complex material than to tabulate it.

References.—References should be typed double space and should be prepared in the following style: name of author, title of article, name of periodical with volume, year, and page numbers. References to journals not commonly known should give the complete name of the periodical, and where published so that they may be added to our reference files. When books are cited, the name of publisher, location, edition, and year should be given.

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COMING MEETINGS

Veterinary Public Health Session, to be held in conjunction with the annual health conference, Pennsylvania State University, State College, Pa., on Aug. 21, 1956, at 2:00 p.m. Rabies, trichinosis, brucellosis, and food poisoning will be discussed. Ernest J. Witte, P.O. Box 90, Harrisburg, Pa., chief, Division of Veterinary Public Health.

Louisiana Veterinary Medical Association. Annual Meeting. Jung Hotel, New Orleans, Aug. 30-31, 1956. William H. Lockard, Jr., P.O. Box 147, Zachary, secretary.

Colorado Veterinary Medical Association. Annual meeting. Estes Park, Sept. 7-9, 1956. G. H. Gilbert, 5500 Wadsworth Blvd. Arvada, Colo., secretary.

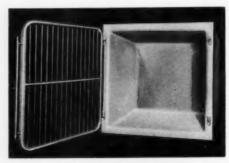
New Mexico Veterinary Medical Association. Annual meeting. Cal Boykin Hotel, Portales, Sept. 10-11, 1956. W. L. Black, Portales, N. M., chairman, program commitree.

Pennsylvania State Veterinary Medical Association, Annual meeting. Bedford Springs Hotel, Bedford, Pa., Sept. 12-14, 1956. Raymond C. Snyder, N.W. Corner Walnut St., and Copley Rd., Upper Darby, Pa., secretary.

Northeast Veterinary Medical Association. Annual meeting. Stroup Animal Clinic, Corinth, Miss., Sept. 12, 1956. James H. Nelson, Box 372, Baldwyn, Miss., secretary.

Central Indiana Veterinary Medical Association. Annual small animal seminar. Highland Country Club, Indianapolis, Sept. 19, 1996. George R. Burch, Pitman-Moore Co., Research Farm, R.R. 1, Box 504, New Augusta. Ind.

New York State Veterinary Medical Society, Annual meeting. Concord Hotel, Kiamesha Lake, N. Y., Sept. 19-21, 1956. L. W. Goodman, 2303 Northern Blvd., Manhasset, general chairman; Miss Joan S. Halat, 803 Varick St., Utica, secretary.



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Washington State Veterinary Medical Association. Annual meeting. Davenport Hotel, Spokane, Sept. 21-22, 1956. P. J. Pfarr, 6306 N. Wall St., Spokane 53, general chairman.

Oklahoma conference for veterinarians. School of Veterinary Medicine, Oklahoma A. & M. College, Stillwater, Sept. 27-28, 1956. A. L. Malle, Department of Veterinary Pathology, chairman.

Missouri, University of. Annual short course for veterinarians. School of Veterinary Medicine, University of Missouri, Columbia, Oct. 1-2, 1956. Cecil Elder, chairman, short course committee.

Purdue University. Annual short course for veterinarians. Purdue University, Lafayette. Ind., Oct. 3-5, 1956, L. M. Hutchings, Purdue University, Department of Veterinary Science, Lafayette, chairman.

Eastern Iowa Veterinary Association, Inc. Annual meeting. Hotel Montrose, Cedar Rapids, Oct. 4-5, 1956. Forrest E. Brutsman, Traer, secretary.

South Dakota Veterinary Medical Association. Annual meeting. Hotel Cataract, Sioux Falls, Oct. 4-5, 1956. J. L. Noordsy, Marion, S. Dak., secretary.

University of Illinois. Annual Conference and extension short course for veterinarians. College of Veterinary Medicine, University of Illinois, Urbana, Oct. 12, 1956, L. E. Boley, Department of Veterinary Clinical Medicine, chairman.

American Association of Veterinary Bacteriologists. Annual meeting. Texas A. & M. College, College Station, Oct. 13, 1956. J. P. Delaphane, Michigan State University, College of Veterinary Medicine, chairman.

American Veterinary Medical Association. Annual meeting. Municipal Auditorium, San Antonio, Texas, Oct. 15-18, 1956. J. G. Hardenbergh, 600 S. Michigan Ave., Chicago 5, Ill., executive secretary.

Veterinary Symposium on Dogs. Kankakee Civic Auditorium, Kankakee, Ill., Oct. 24, 1956. Mr. Harry Miller, Gaines Dog Research Center, 250 Park Ave., New York 17. N. Y., director.

Mississippi Valley Veterinary Medical Association. Annual meeting. Hotel Pere Marquette, Peoria, Ill., Nov. 7-8, 1956. William L. Beer, 612 N. College Ave., Aledo, Ill., secretary.

U. S. Livestock Sanitary Association. Annual meeting. Morrison Hotel, Chicago, Ill., Nov. 28-30, 1956. R. A. Hendershott, 33 Oak Lane, Trenton 8, N. J., secretary.

Animal Care Panel. Annual meeting. Morrison Hotel, Chicago, Ill., Nov. 29-30, 1936. Robert J. Flynn, P.O. Box 299, Lemont, Ill., secretary.

Nebraska Vererinary Medical Association. Annual meeting. Hotel Lincoln, Lincoln, Dec. 3-5, 1936. W. T. Spencer, 1250 North 37th St., Lincoln, secretary.

New York State Veterinary College. Annual conference for veterinarians. New York State Veterinary College, Cornell University, Ithaca, Jan. 2-4, 1957, W. A. Hagan, dean.

Foreign Meetings

Tenth International Congress of Entomology, McGill University and University of Montreal, Montreal, Canada, Aug. 17-25, 1956. J. A. Downes, Division of Entomology, Science Service Bldg., Ottawa, Ont., Canada, secretary.

International Association of Hydatidology. Sixth Congress. Athens, Greece, Sept. 14-18, 1956. Prof. B. Kourias, I. MacKenzie King St., Athens, Greece, general secretary. British Veterinary Association. Annual Congress. Royal Leamington Spa, Leamington, England, Sept. 16-22, 1956. Mr. F. Knight, 7, Mansfield St., Portland Pl., London, W.l., general secretary.

(Continued on p. 32)

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Regularly Scheduled Meetings

ALABAMA—Central Alabama Veterinary Association, the first Thursday of each month. B. M. Lauderdale, Montgomery, secretary.

Jefferson County Veterinary Medical Association, the second Thursday of each month. S. A. Price, 213 N. 15th St., Birmingham, secretary.

ARIZONA—Central Arizona Veterinary Medical Association, the second Tuesday of each month, Keith T. Maddy, Phoenix, Ariz., secretary.

Pima County Veterinary Medical Association, the third Wednesday of each month in Tucson. E. T. Anderson, 8420 Tanque Verde Rd., Tucson, Arix., secretary.

Southern Arizona Veterinary Medical Association, the third Wednesday of each month at 7:30 p.m. E. T. Anderson, Rt. 2, Box 697, Tucson, Ariz., secretary.

CALIFORNIA—Bay Counties Veterinary Medical Association, the second Tuesday of each month. E. Paul, Redwood City, Calif., secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. Wilfred Pimentel, 3455 S. Elm Ave., Fresno, Calif., secretary.

Association of East Bay Veterinarians, bimonthly, the fourth Wednesday. Leo Goldston, 3793 Broadway, Oakland 11, Calif., secretary.

Kern County Veterinary Medical Association, the first Thursday evening of each month. A. L. Irwin, 301 Taft Highway, Bakersfield, Calif., secretary.

Mid-Coast Veterinary Medical Association, the first Thursday of every even month. W. H. Rockey, P. O. Box 121, San Luis Obispo, Calif., secretary.

Monterey Bay Area Veterinary Medical Association, the third Wednesday of each month. Lewis J. Campbell, 90 Corral de Tierra, Salinas, Calif., secretary. North San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month at the Hotel Covell, in Modesto, Calif. Lyle A. Baker, Turlock, Calif., secretary.

Orange Belt Veterinary Medical Association, the second Monday of each month. Chester A. Maeda, 766 E. Highland Ave., San Bernardino, Calif., secretary.

Orange County Veterinary Medical Association, the third Thursday of each month. Donald E. Lind, 2643 N. Main St., Santa Ana, Calif., secretary.

Peninsula Veterinary Medical Association, the third Monday of each month. T. D. Harris, San Mateo, Calif., secretary.

Redwood Empire Veterinary Medical Association, the third Thursday of each month. Robert E. Clark, Napa, Calif., secretary.

Sacramento Valley Veterinary Medical Association, the second Wednesday of each month. W. E. Steinmetz, 4227 Freeport Blvd., Sacramento, Calif., secretary.

San Diego County Veterinary Medical Association, the fourth Tuesday of each month. H. R. Rossoll, 1795 Moore St., San Diego, Calif., secretary.

San Fernando Valley Veterinary Medical Association, the second Friday of each month at the Casa Escobar Restaurant in Studio City. John Chudacoff, 7912 Sepulveda Blvd., Van Nuys, secretary.

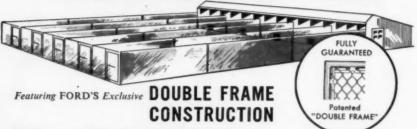
Southern California Veterinary Medical Association, the third Wednesday of each month. Howard C. Taylor, 2811 West Olive St., Burbank, Calif., secretary.

Tulare County Veterinarians, the second Thursday of each month. R. B. Barsaleau, 2333 E. Mineral King, Visalia, Calif., secretary.

COLORADO-Denver Area Veterinary Society, the fourth

(Continued on p. 33)

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Tuesday of every month. Richard C. Tolley, 5060 S. Broadway St., Englewood, Colo., secretary.

Northern Colorado Veterinary Medical Society, the first Monday of each month. M. A. Hammarlund, School of Veterinary Medicine, Colorado A. & M. College, Fort Collins, Colo., secretary.

DELAWARE—New Castle County Veterinary Association, the first Tuesday of each month at 9:00 p.m. in the Hotel Rodney, Wilmington, Del. E. J. Hathaway, Clifton Park Manor, Apt. 73-5, Wilmington 2, Del., secretary.

FLORIDA—Jacksonville Veterinary Medical Association, the second Thursday of each month, time and place specified monthly. George F. Yopp, 4644 Main St., Jacksonville, Fla., Secretary.

Palm Beach Veterinary Society, the last Thursday of each month in the county office building at 810 Datura St., West Palm Beach, Ross E. Evans, 5215 S. Dixie Highway, West Palm Beach, Fla., secretary.

Ridge Veterinary Medical Association, the fourth Thursday of each month in Bartow, Fla. Paul J. Myers, Winter Haven, Fla., secretary.

South Florida Veterinary Society, the third Tuesday of each month, at the Seven Seas Restaurant, Miami, Fla. E. D. Stoddard, 6432 S. W. 8th St., Miami, Fla., secretary.

Suwannee Valley Veterinary Association, the third Friday of each month, at the Thomas Hotel, Gainesville, Fla. R. C. Mann, Rt. 1, Box 37, Ocala, Fla., secretary.

GEORGIA—Atlanta Veterinary Society, the second Tuesday of every month at the Elks Home on Peachtree St., Atlanta, Ga. J. L. Christopher, Smyrna, Ga., secretary.

ILLINOIS—Chicago Veterinary Medical Association, the second Tuesday of each month. Mark E. Davenport, Jr., 215 S. Edgewood Ave., LaGrange, Ill., secretary.

Eastern Illinois Veterinary Medical Association, the first Thursday of March, June, September, and December. A one-day clinic is held in May. H. S. Bryan, College of Veterinary Medicine, University of Illinois, Urbana, secretary.

INDIANA—Central Indians Veterinary Medical Association, the second Wednesday of each month. Peter Johnson, Jr., 4410 N. Keystone Ave., Indianapolis 5, secretary.

Michiana Veterinary Medical Association, the second Thursday of every month, except July and December, at the Hotel LaSalle, South Bend, Ind. J. M. Carrer, 3421 S. Main St., Elkharr, Ind., secretary.

Tenth District Veterinary Medical Association the third Thursday of each month. W. E. Sharp, Union City, Ind., secretary.

IOWA—Cedar Valley Veterinary Association, the second Monday of each month, except January, July, August, and October, at Black's Tea Room, Waterloo, Iowa. H. V. Henderson, Reinbeck, Jowa, secretary.

Coon Valley Veterinary Association, the second Wednesday of each month, September through May, at the Bradford Hotel, Storm Lake, Iowa, D. J. Lee, Sac City, Iowa, secretary.

Fayette County Veterinary Association, the third Tuesday of each month, except in July and August, at Pa and Ma's Restaurant, West Union, Iowa. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

Northeast Iowa-Southern Minnesota Veterinary Association, the first Tuesday of February, May, August, and November at the Wisneslick Hotel, Decorah, Iowa, 6:30 p.m. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

KENTUCKY—Central Kentucky Veterinary Medical Association, the first Wednesday of each month. L. S. Shirrell, Versailles Rd., Frankfort, secretary.

Jefferson County Veterinary Society of Kentucky, Inc., the first Wednesday evening of each month in Louisville

(Continued on p. 34)



small animal therapy note

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MARYLAND—Baltimore City Veterinary Medical Association, the second Thursday of each month, September through May (except December), at 9:00 p.m. at the Park Plaza Hotel, Charles and Madison St., Baltimore, Md. Harry L. Schultz, Jr., 9011 Harford Rd., Baltimore, Md., secretary.

MICHIGAN—Mid-State Veterinary Medical Association, the fourth Thursday of each month with the exception of November and December. Robert E. Kader, 5034 Armstrong Rd., Lansing 17, Mich., secretary.

Saginaw Valley Veterinary Medical Association, the last Wednesday of each month. S. Correll, Rt. 1, Midland, Mich., secretary.

Southeastern Veterinary Medical Association, the fourth Wednesday of every month, September through May. Gilbert Meyer, 14003 E. Seven Mile Rd., Detroit 5, Mich., secretary.

MISSOURI-Greater St. Louis Veterinary Medical Association, the first Friday of the month (except July and August) at the Sheraton Hotel, Spring Ave. and Lindell Blvd. Allen B. Shopmaker, 136 N. Meramec, Clayton 5, Mo., secretary.

Kansas City Small Animal Hospital Association, the first Monday of each month, at alternating hospitals. W. F. Noland, 7504 Metcalf, Overland Park, Kan., secretary.

Kansas City Veterinary Medical Association, the third Tuesday of each month at Exchange Hall, ninth floor, Livestock Exchange Bidg., 1600 Genessee St., Kansas City, Mo. Busch Meredith, 800 Woodswether Rd., Kansas City 5, Mo., secretary.

NEW JERSEY—Central New Jersey Veterinary Medical Association, the second Thursday of November, January, March, and May at Old Hights Inn, Hightstown, N. J. David C. Tudor, Cranbury, N. J., secretary. Metropolitan New Jersey Veterinary Medical Association, the third Wednesday evening of each month from October through April at the Academy of Medicine, 91 Lincoln Park South, Newark, N. J. Myron S. Arlein, 2172 Milburn Ave., Maplewood, N. J., secretary.

Northern New Jersey Veterinary Association, the fourth Tuesday of each month at the Casa Mana in Teaneck. James R. Tanzola, Upper Saddle River, secretary.

Southern New Jersey Veterinary Medical Association, the third Tuesday of each month at the Collingswood Veterinary Hospital, Collingswood. W. E. Snyder, E. Kings Highway and Munn Ave., Haddonfield, secretary.

NEW YORK—New York City, Inc., Veterinary Medical Association of, the first Wednesday of each month at the New York Academy of Sciences, 2 East 63rd St., New York City. C. E. DeCamp, 43 West 61st St., New York 23, N. Y., secretary.

Monroe County Veterinary Medical Association, the firm Thursday of even-numbered months except August. Irwin Bircher, 50 University Ave., Rochester, N. Y., secretary.

NORTH CAROLINA—Central Carolina Veterinary Medical Association, the second Wednesday of each month at 7:00 p.m. in the O'Henry Hotel in Greensboro. J. W. Peace, High Point, secretary.

Eastern North Carolina Veterinary Medical Association, the first Friday of each month. Wm. Allen Potts, 491 W. James St., Mount Olive, secretary.

Piedmont Veterinary Medical Association, the last Friday of each month at 7:00 p.m. in Mull's Motel in Hickory, N. Car. W. W. Dickson, Box 1071, Gastonia, N. Car., secretary.

OHIO—Cuyahoga County Veterinary Medical Association, the first Wednesday of each month, September through May (except January), at 9:00 p.m. at the Carter Hotel, Cleveland, Ohio. Ed. R. Jacobs, 5522 Pearl Rd., Cleveland, Ohio, secretary.

(Continued on p. 36)

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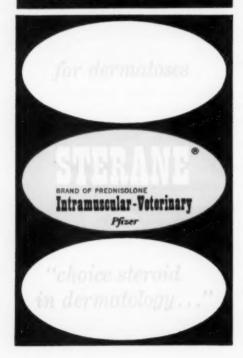
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OKLAHOMA—Oklahoma County Veterinary Medical Association, the second Wednesday of every month. James M. Brown, 2818 W. Britton Rd., Oklahoma City, secretary.

Tulsa Veterinary Medical Association, the third Thursday of each month in Directors' Parlor of the Brook-side State Bank, Tulsa, Okla. Don L. Hohmann, 538 S. Madison St., Tulsa, Okla., secretary.

PENNSYLVANIA-Keystone Veterinary Medical Association, the fourth Wednesday of each month at the University of Pennsylvania School of Veterinary Medicine, 39th and Woodland Ave., Philadelphia 4, Pa. Raymond C. Sqyder, 39th and Woodland Ave., Philadelphia 4, Pa., secretary.

SOUTH CAROLINA-Piedmont Veterinary Medical Association, the third Wednesday of each month at the Fairforest Hotel, Union, S. Car. Worth Lanier, York, S. Car., secretary.

TEXAS—Coastal Bend Veterinary Association, the second Wednesday of each month. J. Marvin Prewitt, 4141 Lexington Blvd., Corpus Christi, Texas, secretary.

VIRGINIA-Central Virginia Veterinarians' Association, the third Thursday of each month at the William Byrd Hotel in Richmond at 8:00 p.m. M. R. Levy, 312 W. Cary St., Richmond 20, Va., secretary.

Southwest Virginia Veterinary Medical Association, the first Thursday of each month. I. D. Wilson, Blacksburg. secretary.

WASHINGTON-Seattle Veterinary Medical Association the third Tuesday of each month in the Trinity Episcopal Church, 8th and James St., Seattle, Wash. P. R. Des Rosiers, 5508 2nd Ave., N. W., Seattle 7, Wash., secretary.

South Puget Sound Veterinary Association, the second Thursday of each month except July and August. O. L. Bailey, P. O. Box 906, Olympia, Wash., secretary.

WEST VIRGINIA—Kyowva (Ky., Ohio, W. Va.) Veter-inary Medical Association, the second Thursday of each month in the Hotel Prichard, Huntington, W. Va., at 8:30 p.m. Harry J. Fallon, 200 5th St., W., Huntington, W. Va., secretary.

WISCONSIN-Milwaukee Veterinary Medical Association, the third Tuesday of each month, at the Half-Way House, Blue Mound Rd. George F. Lynch, 201 West Devon St., Milwaukee 17, Wis., secretary.

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Names of classified advertisers using key letters can not be supplied. Address your reply to the key letters, c/o JOURNAL of the AVMA, 600 S. Michigan Ave., Chicago 5, III., and it will be transmitted to the advertiser.

Wanted-Veterinarians

Veterinarian wanted as assistant for small animal hospital in Illinois; partnership arrangement after trial period. Full particulars in first letter including salary expected. Address "Box R 9," c/o JOURNAL of the AVMA.

Opening for veterinarian to take entire charge of recently built small animal hospital in San Francisco area. Reply to 618 Blair Ave., Piedmont, Calif.

Veterinarian wanted as assistant in small animal hospital in Kansas. Write experience, school, and salary desired. Address "Box S 3," c/o JOURNAL of the AVMA.

Veterinarian wanted by veterinary division of major company for service work and clinical research in livestock and poultry problems. Prefer recent graduate. Please include resumé of academic training and industrial experience with reply. Send qualifications to "Box S 6," c/o JOURNAL of the AVMA.

Assistant veterinarian wanted for modern small animal hospital in Maryland. Requirements—Graduate of AVMA-approved school, willing to work. State salary expected. Living quarters provided. Excellent future for right man. Address "Box S 20," c/o JOURNAL of the AVMA.

There are vacancies for veterinarians in regulatory work in Logan and Brigham City, Utah. Annual salary, \$5,200 and up. Address "Box S 8," c/o JOURNAL of the AVMA.

(Continued on p. 44)

Vistrepcin—A New Product of Diamond Labs

Diamond Laboratories has recently developed a highly dispersible antibiotic-vitamin powder called "vistrepcin." The product is designed as a drinking-water additive to be used at both nutritional reatment levels for swine, poultry, and calves. It contains procaine penicillin, streptomycin sulfate, riboflavin, calcium pantothenate, niacin, vitamins B₁₃, A, and D₃.

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Daily Dosage: ½ tablet for animals 2 to 5 lb. in weight, 1 tablet for 5 to 20 lb., 1 to 2 tablets for 20 to 50 lb., and 2 to 3 tablets for larger animals.

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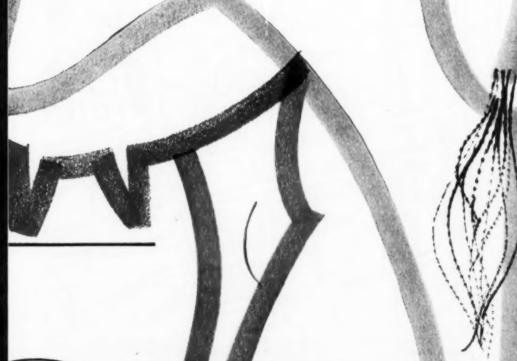
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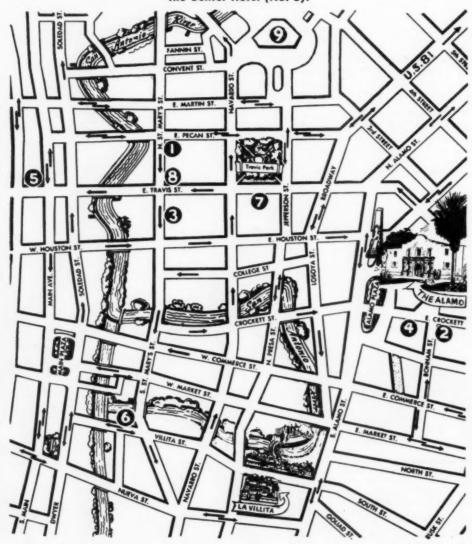
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Hotel Map of San Antonio

The general sessions and larger section meetings will be held at the Municipal Auditorium (No. 9). The smaller section meetings will be held at the Gunter Hotel (No. 3).



- 1. Blue Bonnet Hotel
- 2. Crockett Hotel
- 3. Gunter Hotel
- 4. Menger Hotel
- 5. Robert E. Lee Hotel
- 6. Plaza Hotel
- 7. St. Anthony Hotel
- 8. White Plaza Hotel
- 9. Auditorium

Motel Information—Motels listed on the reservation form are located on Austin Highway, U.S. 81, which enters San Antonio via Broadway. Rio Lado Motel is at 1100 N. St. Mary's St., near the business section.

HOTEL RESERVATIONS - SAN ANTONIO CONVENTION

Ninety-Third Annual AVMA Meeting, Oct. 15-18, 1956

All requests for hotel accommodations will be handled by a Housing Bureau in cooperation with the Committee on Local Arrangements. The Bureau will clear all requests and confirm reservations.

Ho	tels—Motels and Rate	s (all are air-cond	ditioned) ——			
HOTEL	SINGLE	DOUBLE	TWIN BE	DS		
1. Blue Bonnet	\$3.00-5.00	\$5.00-8.00	S			
2. Crockett	\$3.50-4.50	\$5.50-6.50	******			
3. Gunter 4. Menger	\$5.00 and up \$5.00-8.00	\$6.50 and up \$7.00-12.00				
5. Robert E. Lee	\$3.50-5.00	\$5.00-6.00	\$6,00-8,00			
7. St. Anthony	\$5.00 and up	\$7.00 and up				
8. White Plaza	\$3.25 and up	\$4.75 and up	* * * * * * * *			
MOTEL	RATES					
1. Aero	\$7.50-9.00					
2. Aloha	\$6.00 and up					
3. Belvedere	\$6.00-10.00					
4. Casa Linda 5. Koronado	\$6.00 and up					
6. Park	\$4.00-15.00					
7. Rio Lado	\$6.00-10.00					
8. The Westerner	\$5.00 and up					
9. Flamingo	\$6.00 and up					
HOTEL Single room(s) at \$		MOTEL Indicate type of accommodations				
Double bed ro	om(s) at \$	(
Twin-bed room	i(s) at \$	1	Unit, Cabin,			
Suite (specify	type of		persons	0		
accommodation	s wanted)	No.		rate		
(Three choices MUST be sh	own)	(Three choice	es MUST be sho	own)		
First choice hotel —		First choice m	otel			
Second choice botel -		Second choice motel -				
Third choice hotel -		Third choice m	otel -			
Arriving on (date)		st	a.m	p.m.		
Leaving on (date)		at	a.m	p.m.		
Will be occupied by (attach	list of additional names	if necessary).				
Your Name (Print or Tour)						

_City and State or Province __

Street Address

Correspondence

June 6, 1956

Dear Sir:

In the Feb. 1, 1956, issue of the JOURNAL of the American Veterinary Association, there is an article entitled "Nocardiosis (Actinomycosis) in the Dog," whose title is misleading in that it fails to distinguish between nocardiosis and actinomycosis. The literature has been confused on this point for over half a century and only in the last decade has some order been brought to the classification of those diseases caused by the family Actinomycetaceae. The distinction is important because of the different therapy in the two diseases. The term "nocardiosis" should be restricted to those cases caused by an aerobic, gram-positive, variably acid-fast, filamentous organism which is commonly a saprophyte free-living in nature. The most frequent organism in nocardiosis is Nocardia asteroides. The term "actinomycosis" should be reserved for those cases caused by the type species Actinomyces bovis which is a gram-positive, nonacid-fast, anaerobic or micro-aerophilic parasite which produces true mycelium and frequently produces "sulfur granules" in tissue. This distinction between Actinomyces and Nocardia was originally devised in 1943 by Waksman and Henrici and has been widely accepted and included in Bergey's "Manual of Determinative Bacteriology."

The 6 cases of canine nocardiosis reported by Dr. Moss have all been diagnosed on histologic grounds. This is frequently a difficult, if not impossible, task. No mention is made of acid-fast staining of the organisms, and in one of the inoculated animals sulfur-like granules are described in the tissues. Such granules have never been reported in nocardiosis. The histologic appearance as described in Dr. Moss' case is that of chronic granulomatous inflammation and fibrosis, two findings which are more characteristic of actinomycosis than nocardiosis, where the reaction tends to be suppurative with little or no epithelioid

sponse.

For the reasons stated above, the cases reported should not be labeled nocardiosis.

Very truly yours, s/HERBERT DERMAN, M. D., Kingston, N. Y.

Cat Is "Seeing Eye" for a Blind Dog

A 17-year-old Angora cat has assumed the responsibility as a "seeing eye" for a younger but blind, nearly deaf, and crippled dog. The owner noticed that the two were inseparable, the cat always walking at the dog's side. When there is a reason to stop, the cat nudges the dog. Sometimes he puts his paw against the dog's side and gives him a hard shove. When the dog wishes to stop, the cat curls up and waits for the next move.—Our Dumb Anim., Feb., 1956.

Veterinarian wanted for extensive general practice in Illinois. Can lead to profit sharing. State availability, experience, and other key information. Address "Box S 9," c/o Journal of the AVMA.

Veterinarian wanted for mostly small animal work; must be trustworthy and have pleasing personality. Would consider woman graduate. Permanent with good future. Address "Box S 10," c/o JOURNAL of the AVMA.

Veterinarian with small animal experience wanted for AAHA hospital in eastern United States. Apartment available. Address "Box S 11," c/o JOURNAL of the AVMA.

Wanted-Positions

Interested in partnership or purchase of general practice in Pennsylvania or Massachusetts in dairy area near population center of 25,000 with good schools and recreational facilities. Have capital. Address "Box S 2," c/o JOURNAL of the AVMA.

Experienced veterinarian desires position in small animal practice; licensed in Maryland and Ohio. Available immediately. Address "Box S 4," c/o JOURNAL of the AVMA.

Recent graduate of AVMA-approved school desires position on west coast preferably small animal. Experienced, single, draft-exempt. Willing to work and accept responsibility. Address "Box S 19," c/o JOURNAL of the AVMA.

Experienced veterinarian and business man, 29, married, desires to associate with Florida practitioner. Present operation, 75% cattle—25% small animals. Will accept responsibility; accustomed to long hours and hard work. Funds available for option to purchase. Address "Box S 13," c/o JOURNAL of the AVMA.

Wanted-Practices

Wish to purchase dairy practice in Wisconsin. I would be able to make a substantial down payment. Address "Box S 18," c/o JOURNAL of the AVMA.

Wanted to lease in Maryland, with or without option to buy, active successful small animal hospital. Give full details in first reply. All letters answered. Address "Box R 2," c/o JOURNAL of the AVMA.

Small animal practice wanted, or position leading to purchase or partnership; thorough experience, age 30, married. Capital available; consider any good location. Address "Box S 1," c/o JOURNAL of the AVMA.

(Continued on p. 46)





immunize against distemper and hepatitis with one single shot...

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Available from independent ethical distributors.

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For Sale or Lease-Practices

Small animal practice for sale in southern California; no real estate. Must sell quickly or lease with option to buy; reason, health. Priced within reason within liberal terms. Address "Box L 13." c/o JOURNAL of the AVMA.

Small animal hospital for sale or lease, with option to buy, in southern bay-area city of California; 38-cage capacity. Address "Box S 12," c/o JOURNAL of the AVMA.

Veterinarian wanted as assistant in small animal practice. Address Dr. J. B. Engle, Summit Dog and Cat Hospital, Summit, N. J.

Mixed practice for sale in central North Carolina near big city; established 8 years; new hospital. Price, \$8,500, includes real estate, drugs, instruments, and x-ray. Address "Box S 5," c/o JOURNAL of the AVMA.

Mixed practice for sale in central Nebraska; ir-

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Take the work out of raising puppies. Use this easy self-feeding method with the economical all-in-one WAYNE DOG FOOD! Complete high-energy formula gives you simplified feeding. No extras needed.







rigated area. County to be tested this fall for brucellosis. Full price, \$1,000, includes chute, office equipment inventory. Address "Box S 14," c/o JOURNAL of the AVMA.

Practice for sale, 85% dairy and hogs; 5 outdoor dog runs; 10 acres; 2 hours from Madison, Wis. Sell for value of real estate, drugs, equipment, \$13,500. Address "Box S 15," c/o JOURNAL of the AVMA.

Miscellaneous

Large and small animal drugs and equipment for sale; nearly new. Office equipment, also. Tremendous savings. Located in Michigan. Address "Box S 7," c/o JOURNAL of the AVMA.

Artificial Udder-Beco Litter Feeder-nurses 8 puppies simultaneously. Stays warm; easily cleaned sterilized. Complete unit, \$15; guaranteed. Breeders Equipment Co., Flourtown, Pa.

Breedersleve-The disposable obstetrical sleeve. Package of 25 with detachable chest band, \$5.00; lower wholesale prices. Free sample upon request. Breeders Equipment Co., Flourtown, Pa.

Pregnancy diagnosis in mares-45th to 150th day. Request mailing tubes; \$7.00, 2 or more, \$6.00 each. Pregnancy Diagnostic Laboratories, Dysart, Iowa.

Wanted: Back issues, American Journal of Veterinary Research, vol. 13, No. 46 and 48. Reply to Chas. Pfizer & Co., Inc., Technical Library, 11 Bartlett St., Brooklyn 6, N.Y.

(Continued on p. 47)

Dairy and bog practice for sale in southern Minnesota. Home, office, drugs, and equipment including Ranger chute and 2-way radio. Gross \$30,000. Price \$20,000. Address "Box S 17," c/o JOURNAL of the AVMA.

Established, rapidly expanding, small animal practice. Best smog-free southern California climate. Well built, two-year-old clinic building of modern design. Fine opportunity for young man. Realistic terms to right veterinarian. Address "Box S 16," c/o JOURNAL of the AVMA.

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